Access DB# 100557

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: LEE, RIP A. Examiner #: 78680 Date: AUG 06, 2003
Art Unit: 1713 Phone Number 30 6-0094 Serial Number: 10/009,094
Mail Box and Bldg/Room Location: CP3 8C32 Results Format Preferred (circle): PAPER DISK E-MAIL

If mor than one search is submitted, please prioritize searches in order of need.

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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: PROCESS for PRODUCING OLEFIN LIVING POLYMER

Inventors (please provide full names): SOGA, Kazuo ; SOGA, Hisae ; SUZUKI, Yasuzo ; SHIONO, Takeshi

Earliest Priority Filing Date: May 10, 1999 PCT/JP00/02891 5/02/2000

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.* JP (3) 11-261,952... 5/10/99

Please conduct text search for journal articles/patents containing the following terms (in order of importance):

(1) LIVING POLYMER/POLYMERIZATION

(2) CYCLOPENTADIENYL, PENTAMETHYLCYCLOPENTADIENYL, INDENYL or FLUORENYL

(3) BORANE and/or BORATE

(4) TITANIUM, ZIRCONIUM, HAFNIUM or "GROUP 4" "GROUP IV"

* I believe a search using (1), (3), and (4) would suffice to capture keywords in group(2) as well.

* If you have questions, please do not hesitate to contact me (306-0094. Thanks!

****

STAFF USE ONLY	Type of Search	Vendors and cost where applicable
Searcher: Tom Cecil	NA Sequence (#)	STN
Searcher Phone #:	AA Sequence (#)	Dialog
Searcher Location:	Structure (#)	Questel/Orbit
Date Searcher Picked Up: 8/14/03	Bibliographic	Dr.Link
Date Completed: 8/14/03	Litigation	Lexis/Nexis
Searcher Prep & Review Time: 120	Fulltext	Sequence Systems
Clerical Prep Time:	Patent Family	WWW/Internet
Online Time: 120	Other	Other (specify)

PTO-1590 (8-01)

STIC Search Report
EIC 1700

USPTO

STIC Database Tracking Number: 100557

TO: Rip A Lee **Location: CP3 8C32** **Art Unit : 1713** **August 14, 2003** **Case Serial Number: 10/009094**	**From: John Calve** **Location: EIC 1700** **CP3/4-3D62** **Phone: 308-4139** **John.Calve@uspto.gov**

Search Notes

sira
Search and Information Resources Administration

STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact ***the EIC searcher or contact:***

Kathleen Fuller, EIC 1700 Team Leader
308-4290, CP3/4-3D62

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example: 1713*
- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
  (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found:***
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to STIC/EIC1700 CP3/4 3D62

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=> d his

     (FILE 'HOME' ENTERED AT 13:09:04 ON 14 AUG 2003)

     FILE 'HCA' ENTERED AT 13:09:36 ON 14 AUG 2003
                E JP11128732/PN
L1            1 S E3
                E JP11261950/PN
                E JP11261952/PN
L2            0 S FUKUI ?/AI
L3         2738 S (LIVING AND POLYMER?)/TI
L4        12254 S FUKUI ?/AU
L5           15 S L3 AND L4
L6          794 S (LIVING AND POLYMER#)/TI
L7            4 S L5 AND L6
L8            2 S L7 AND OLEFIN?/TI
L9            1 S L8 AND BORATE?
                SEL L9 RN

     FILE 'REGISTRY' ENTERED AT 13:14:20 ON 14 AUG 2003
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L12          13 S L10 NOT L11
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L14          11 S L12 NOT L13
L15           2 S L14 AND 1-5/AL
L16           9 S L14 NOT L15

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L18       89499 S L11
L19        1646 S L13
L20          44 S L17 AND L18 AND L19
L21          31 S L20 AND 1907-1999/PY,PRY
L22        6990 S LIVING?(3N)POLYM?
L23           3 S L21 AND L22
L24     1281902 S POLYMERIZ? OR POLYMERIS? OR POLYM# OR CURE# OR CURING# OR CRO
L25          31 S L21 AND L24
L26       74307 S BORANE## OR BORATE##
L27          24 S L25 AND L26
L28       55831 S LIVING?
L29           3 S L21 AND L28
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L33          11 S L27 AND L31
L34           9 S L33 NOT L30
L35        6711 S LIVING?(2N)POLYM?
L36          79 S L35 AND L26
L37       95997 S ?CYCLOPENTADIEN? OR INDENYL# OR FLUORENYL# OR FLUORENE# OR IN
L38          24 S L36 AND L37

     FILE 'LCA' ENTERED AT 13:30:12 ON 14 AUG 2003
L39        1803 S TI OR TITANIUM# OR ZIRCONIUM# OR ZR OR HAFNIUM# OR HF

     FILE 'HCA' ENTERED AT 13:36:38 ON 14 AUG 2003
L40          17 S L38 AND L39
L41         221 S L16 AND L19
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L46           8 S L42 NOT (L34 OR L30 OR L40)
L47          25 S L45 OR L42
L48          22 S L47 NOT (L34 OR L30)

=> d L30 1-3 ibib abs hitind hitstr

L30  ANSWER 1 OF 3  HCA  COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER:        134:252767  HCA
TITLE:                   Manufacture of carbonyl-terminated polyolefins with
                         narrow molecular weight distribution
INVENTOR(S):             Soga, Kazuo; Shiono, Takeshi; Asai, Michihiko; Suzuki,
                         Seizo; Miyazawa, Akira; Tsuchihara, Kenji; Murata,
                         Masahide; Ozaki, Hiroyuki; Kawabe, Masanao; Kase,
                         Toshio; Jiju, Jin; Hagiwara, Hideaki; Fukui, Yoshifumi
PATENT ASSIGNEE(S):      Agency for Industrial Science and Technology, Japan;
                         Kagaku Gijitsu Senryakusuishin Kiko
SOURCE:                  Jpn. Kokai Tokkyo Koho, 19 pp.
                         CODEN: JKXXAF
DOCUMENT TYPE:           Patent
LANGUAGE:                Japanese
FAMILY ACC. NUM. COUNT:  1
PATENT INFORMATION:

     PATENT NO.          KIND  DATE          APPLICATION NO.   DATE
     ------------------  ----  --------      ----------------  --------
     JP 2001081123       A2    20010327      JP 1999-261951    19990916 <--
PRIORITY APPLN. INFO.:                     JP 1999-261951      19990916 <--
OTHER SOURCE(S):         MARPAT 134:252767
AB   Title polyolefins are manufd. by polymg. C2-20 olefin monomers using
     catalysts comprising (A) Zr compds. having 1 or 2 cyclopentadienyl
     group(s), (B) boranes BPh3 or borates Ph4X+B- (Ph may be substituted), (C)
     Ti compds., and optionally (D) Al compds. AlR3-nYn [R = C4-20 hydrocarbyl;
     Y = halo, alkoxy, trialkylsiloxy, di(trialkylsilyl)amino, trialkylsilyl; n
     = 0, 1, 2] at -20 to -100.degree. and treating the resulting
     living polymers with carbonylation agents.  Thus, 83
     mmol propylene was polymd. in the presence of trioctylaluminum,
     pentamethylcyclopentadienyltitanium trichloride,
     tris(pentafluorophenyl)boron, and dimethylbis(cyclopentadienyl)zirconium
     and treated with CO to yield 28.8 mg of a polymer with Mn (on
     polypropylene) 2560, Mw/Mn 1.25 and CO content .apprx.1 mol. per 1 polymer
     chain.
IC   ICM  C08F004-642
     ICS  C08F008-00; C08F010-00
CC   35-3 (Chemistry of Synthetic High Polymers)
ST   living polyolefin manuf borane titanium zirconium catalyst;
     borate titanium zirconium catalyst living polyolefin manuf;
     aluminum titanium zirconium living polymn catalyst
     polyolefin; carbonylated polypropylene manuf titanium zirconium catalyst
IT   Polymerization catalysts
        (living; prepn. of CO-terminated polyolefins using B-Ti-Zr
        living polymn. catalysts)
IT   Carbonylation
        (prepn. of CO-terminated polyolefins using B-Ti-Zr living
        polymn. catalysts)
IT   Polyolefins
     RL: IMF (Industrial manufacture); PREP (Preparation)
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(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)

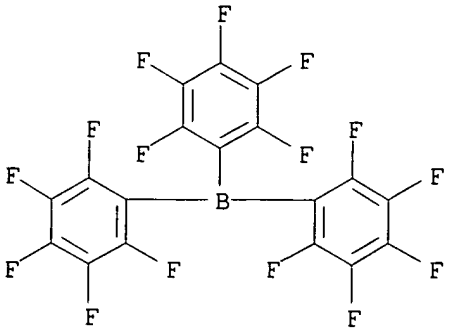
IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(pentafluorophenyl)boron **1291-32-3**, Biscyclopentadienylzirconium dichloride **12129-06-5**, Pentamethylcyclopentadienyltitanium trichloride **12636-72-5**, Bis(cyclopentadienyl)zirconium dimethyl **37342-97-5**, Bis(cyclopentadienyl)zirconium hydridochloride **107333-47-1**, Trimethyl(pentamethylcyclopentadienyl)titanium **132510-07-7** **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)

IT 630-08-0DP, Carbon monoxide, reaction products with polypropylene, preparation **9003-07-0DP**, Polypropylene, carbonyl-terminated
RL: IMF (Industrial manufacture); PREP (Preparation)
(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)

IT 97327-58-7P, **Living** polypropylene
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)

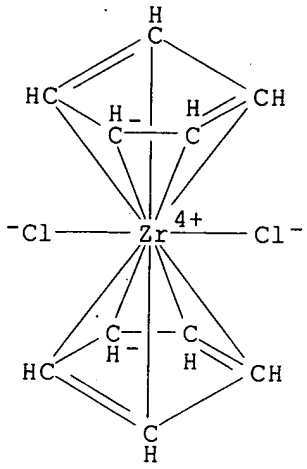
IT **1109-15-5**, Tris(pentafluorophenyl)boron **1291-32-3**, Biscyclopentadienylzirconium dichloride **12129-06-5**, Pentamethylcyclopentadienyltitanium trichloride **12636-72-5**, Bis(cyclopentadienyl)zirconium dimethyl **37342-97-5**, Bis(cyclopentadienyl)zirconium hydridochloride **107333-47-1**, Trimethyl(pentamethylcyclopentadienyl)titanium **132510-07-7** **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)

RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



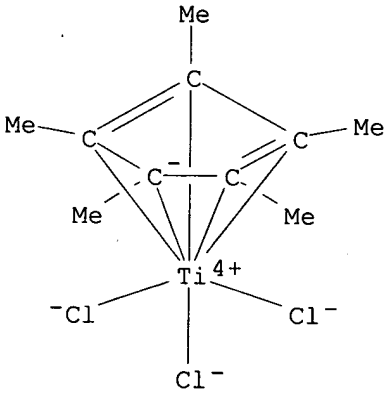
Borane.

RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)

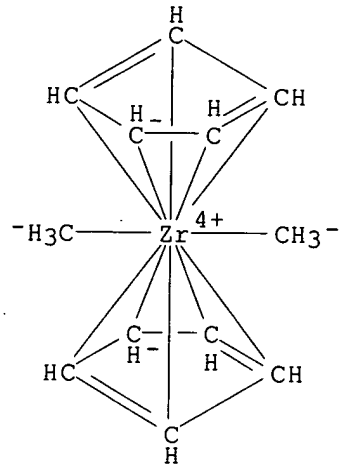


metal + cyclodienyl

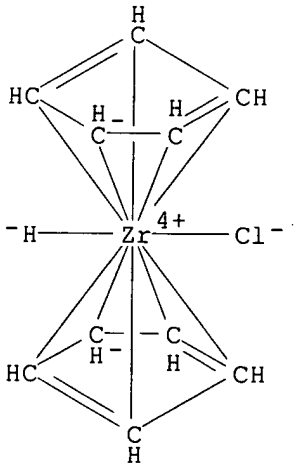
RN 12129-06-5 HCA
CN Titanium, trichloro[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



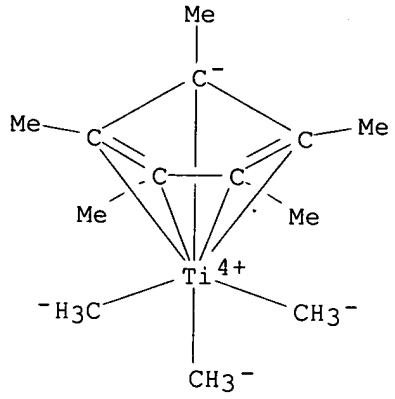
RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



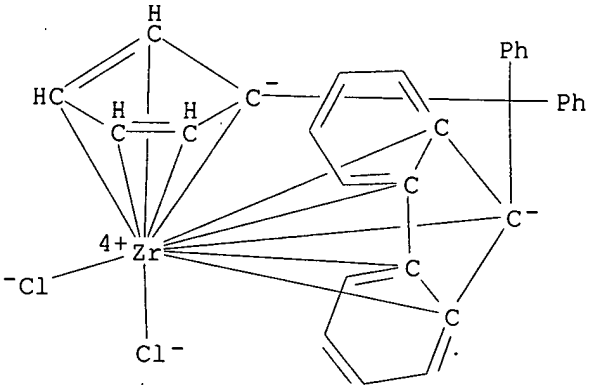
RN 37342-97-5 HCA
CN Zirconium, chlorobis(.eta.5-2,4-cyclopentadien-1-yl)hydro- (9CI) (CA INDEX NAME)



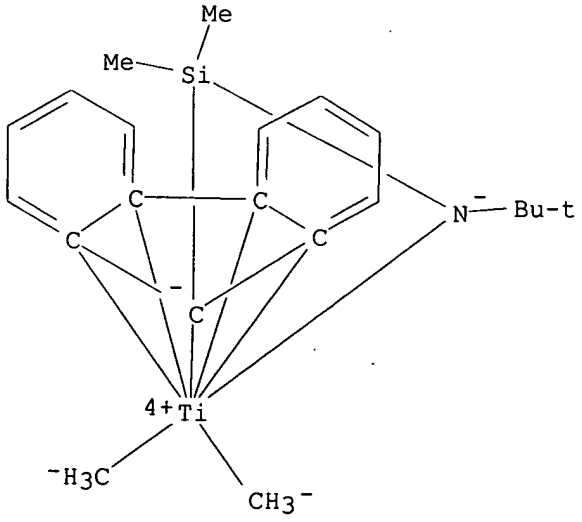
RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



RN 132510-07-7 HCA
CN Zirconium, dichloro[.eta.10-2,4-cyclopentadien-1-ylidene(diphenylmethylene)-9H-fluoren-9-ylidene]- (9CI) (CA INDEX NAME)



RN 207728-92-5 HCA
CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



IT **9003-07-0DP**, Polypropylene, carbonyl-terminated
RL: IMF (Industrial manufacture); PREP (Preparation)
(prepn. of CO-terminated polyolefins using B-Ti-Zr **living polymn.** catalysts)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6

$H_3C-CH=CH_2$ polymn.

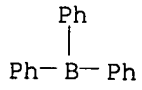
L30 ANSWER 2 OF 3 HCA COPYRIGHT 2003 ACS on STN AUTHORS
ACCESSION NUMBER: 133:350707 HCA
TITLE: Process for producing olefin **living polymers** and catalysts therefor
INVENTOR(S): Soga, Kazuo; Shiono, Takeshi; Asai, Michihiko; Suzuki, Yasuzo; Miyazawa, Akira; Tsuchihara, Kenji; Murata, Masahide; Ozaki, Hiroyuki; Kawabe, Masanao; Kase, Toshio; Jin, Jizhu; Hagiwara, Hideaki; Fukui, Yoshifumi
PATENT ASSIGNEE(S): Japan as Represented by Director General of the Agency of Industrial Science, Japan; Japan Chemical Innovation Institute; et al.
SOURCE: PCT Int. Appl., 76 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000068276	A1	20001116	WO 2000-JP2891	20000502 <--
W: US				
RW: BE, DE, FR, GB, IT, NL				
JP 2001026612	A2	20010130	JP 1999-261952	19990916 <--
JP 2001081120	A2	20010327	JP 1999-261950	19990916
JP 2001026614	A2	20010130	JP 1999-284280	19991005 <--
EP 1209171	A1	20020529	EP 2000-922948	20000502 <--
R: BE, DE, FR, GB, IT, NL				

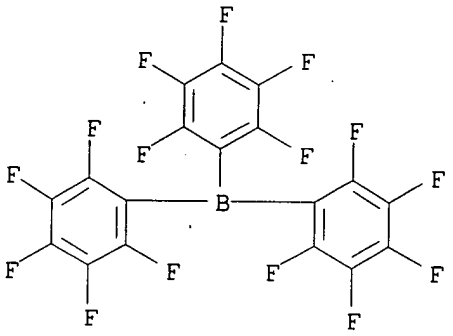
PRIORITY APPLN. INFO.:
JP 1999-128732 A 19990510 <--
JP 1999-261950 A 19990916 <--
JP 1999-261952 A 19990916 <--
WO 2000-JP2891 W 20000502
OTHER SOURCE(S): MARPAT 133:350707
AB Polymers having mol. wt. distribution (Mw/Mn) 1-1.3 are prepd. by polymg. a C2-20 olefin monomer at a low temp. in the presence of a catalyst comprising an Hf or Zr compd. having 1 or 2 cyclopentadienyl skeletons, a Ph3B compd. or Ph4B salt, and optionally a mono-, di-, or trialkylaluminum compd. For catalysts contg. a Zr compd. and a Ti compd., a high polymn. temp. is used. Thus, propylene was polymd. with tri-n-octylaluminum, biscyclopentadienylzirconium di-Me, and tri(pentafluorophenyl)boron to give polypropylene having Mn 9400 and Mw/Mn 1.06.
IC ICM C08F004-643

ICS C08F004-645; C08F004-646; C08F010-00
CC 35-3 (Chemistry of Synthetic High Polymers)
ST olefin **living polymn** catalyst zirconium boron aluminum; mol wt distribution polypropylene
IT Molecular weight
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT Borates
Organometallic compounds
RL: CAT (Catalyst use); USES (Uses)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT Polyolefins
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); PREP (Preparation); PROC (Process)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT Transition metal complexes
RL: CAT (Catalyst use); USES (Uses)
(cyclopentadienyl; catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT **Polymerization** catalysts
(**living**; catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT Polymerization catalysts
(metallocene; catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT 100-99-2, Tri(isobutylaluminum), uses **960-71-4**, Triphenylboron **1070-00-4** **1109-15-5** **1291-32-3**, Biscyclopentadienylzirconium dichloride **12129-06-5**, Pentamethylcyclopentadienyltitanium trichloride **12636-72-5**, Biscyclopentadienylzirconium dimethyl **37260-88-1**, Biscyclopentadienylhafnium dimethyl **37342-97-5**, Biscyclopentadienylzirconium chloride hydride **107333-47-1**, Pentamethylcyclopentadienyltitanium trimethyl **132510-07-7** **136844-77-4**, Rac-ethylenebisindenylzirconium dimethyl **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT **9003-07-0P**, Polypropylene **25067-06-5P**, Poly(1-hexene)
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); PREP (Preparation); PROC (Process)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
IT **960-71-4**, Triphenylboron **1109-15-5** **1291-32-3**, Biscyclopentadienylzirconium dichloride **12129-06-5**, Pentamethylcyclopentadienyltitanium trichloride **12636-72-5**, Biscyclopentadienylzirconium dimethyl **37260-88-1**, Biscyclopentadienylhafnium dimethyl **37342-97-5**, Biscyclopentadienylzirconium chloride hydride **107333-47-1**, Pentamethylcyclopentadienyltitanium trimethyl **132510-07-7**

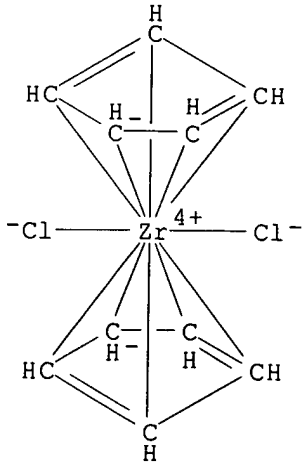
136844-77-4, Rac-ethylenebisindenylzirconium dimethyl
207728-92-5
RL: CAT (Catalyst use); USES (Uses)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
RN 960-71-4 HCA
CN Borane, triphenyl- (8CI, 9CI) (CA INDEX NAME)



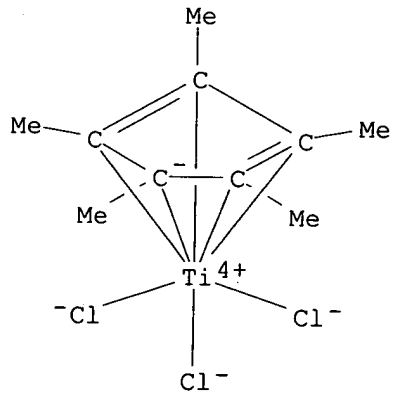
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



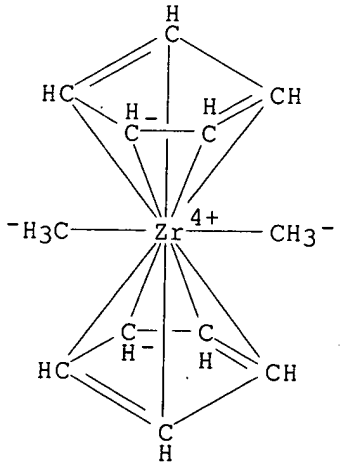
RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)



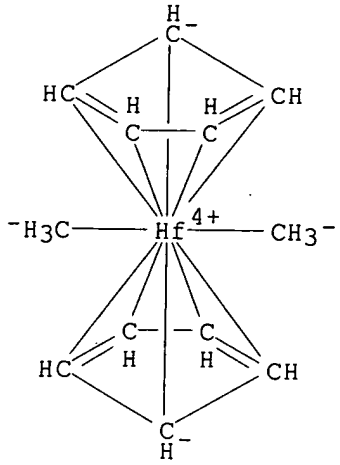
RN 12129-06-5 HCA
CN Titanium, trichloro[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



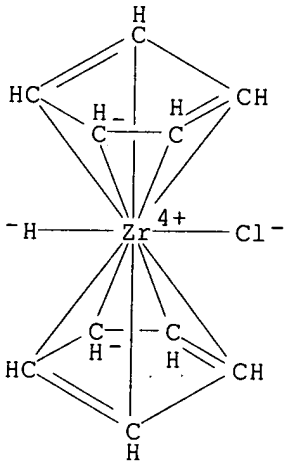
RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



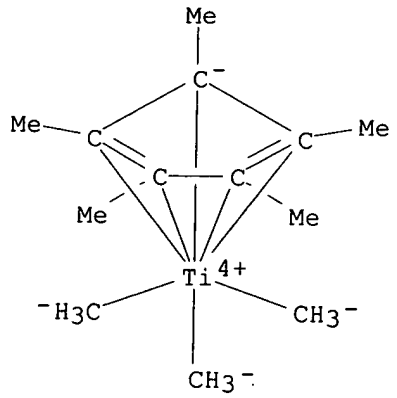
RN 37260-88-1 HCA
CN Hafnium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



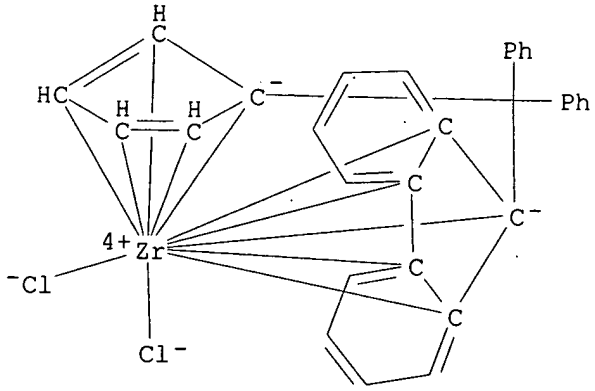
RN 37342-97-5 HCA
CN Zirconium, chlorobis(.eta.5-2,4-cyclopentadien-1-yl)hydro- (9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)

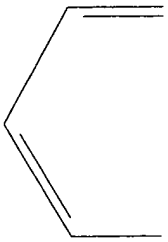


RN 132510-07-7 HCA
CN Zirconium, dichloro[.eta.10-2,4-cyclopentadien-1-ylidene(diphenylmethylene)-9H-fluoren-9-ylidene]- (9CI) (CA INDEX NAME)

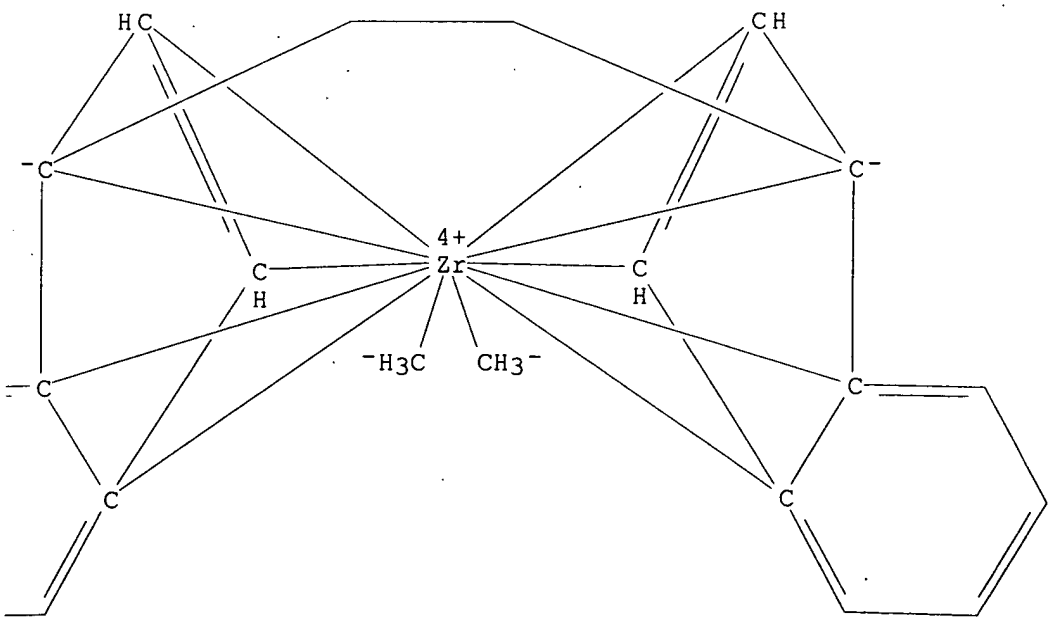


RN 136844-77-4 HCA
CN Zirconium, [rel-(7aR,7'aR)-1,2-ethanediylbis[(1,2,3,3a,7a-.eta.)-1H-inden-1-ylidene]]dimethyl- (9CI) (CA INDEX NAME)

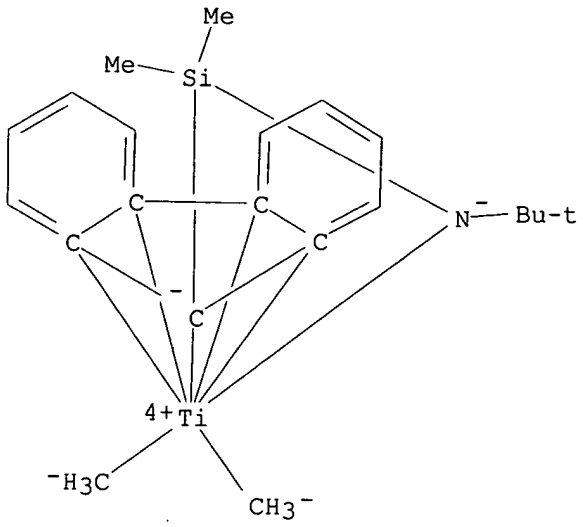
PAGE 1-A



PAGE 1-B



RN 207728-92-5 HCA
CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropylene **25067-06-5P**, Poly(1-hexene)
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); PREP (Preparation); PROC (Process)
(catalysts contg. zirconium and hafnium compds. and boron compds. and aluminum compds. for producing olefin **living polymers** having narrow mol. wt. distribution)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6

$H_3C-CH=CH_2$

RN 25067-06-5 HCA
CN 1-Hexene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 592-41-6
CMF C6 H12

$H_2C=CH-Bu\text{-}n$

REFERENCE COUNT: 42 THERE ARE 42 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L30 ANSWER 3 OF 3 HCA COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 128:49264 HCA
TITLE: Titanium-catalyzed formation of high molecular weight elastomeric polypropene: evidence for **living** propene **polymerization**
AUTHOR(S): Sassmannshausen, Jorg; Bochmann, Manfred; Rosch, Joachim; Lilge, Dieter
CORPORATE SOURCE: School of Chemistry, University of Leeds, Leeds, LS2

9JT, UK
SOURCE: Journal of Organometallic Chemistry (**1997**), 548(1), 23-28
CODEN: JORCAI; ISSN: 0022-328X
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Catalyst generated from 1:1 mixts. of Cp*TiMe3 and B(C6F5)3 are highly active for the polymn. of propene in toluene, light petroleum or liq. propene to give atactic polypropene of unusually high mol. wt. (Mw .ltoreq.4 .times. 106) and narrow polydispersity. The polymer is elastomeric. The presence of polymer fractions with Mw/Mn 1.1, as revealed by Schulz-Zimm anal. of the GPC data, and the behavior of the catalyst indicates that a significant proportion of the Ti centers act as **living** propene **polymn.** catalysts. Al trialkyls act as catalyst poisons, reducing polymer yield and mol. wt. and substantially broadening the mol. wt. distribution.

CC 39-6 (Synthetic Elastomers and Natural Rubber)

ST **living** propene **polymn** titanium catalyst; elastomeric polypropene prepn titanium catalyst

IT **Polymerization** catalysts
(**living**; propene **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)

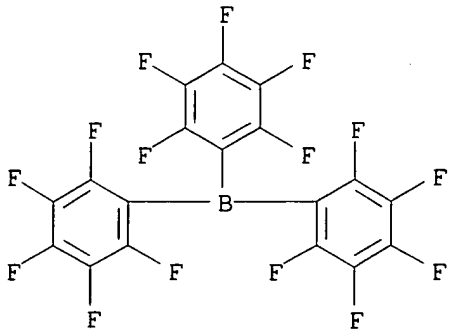
IT Polyolefin rubber
RL: SPN (Synthetic preparation); PREP (Preparation)
(propene; prepn. by **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)

IT **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Pentamethylcyclopentadienyl)trimethyltitanium
RL: CAT (Catalyst use); USES (Uses)
(elastomeric polypropene prepn. by **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)

IT **9003-07-0P**, Polypropene
RL: SPN (Synthetic preparation); PREP (Preparation)
(elastomeric polypropene prepn. by **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)

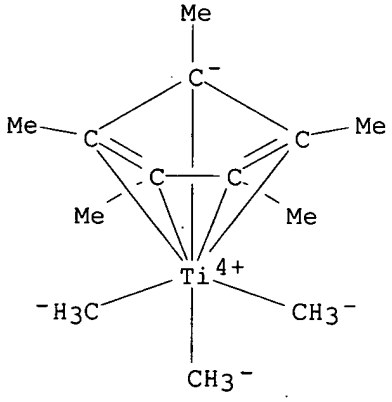
IT **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Pentamethylcyclopentadienyl)trimethyltitanium
RL: CAT (Catalyst use); USES (Uses)
(elastomeric polypropene prepn. by **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)

RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-

cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropene
RL: SPN (Synthetic preparation); PREP (Preparation)
(elastomeric polypropene prepn. by **living polymn.** using Cp*TiMe3/B(C6F5)3 catalyst system)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6

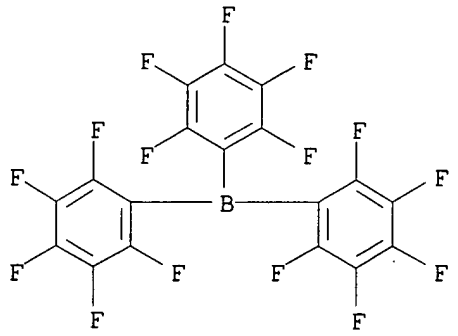
$H_3C-CH=CH_2$

REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

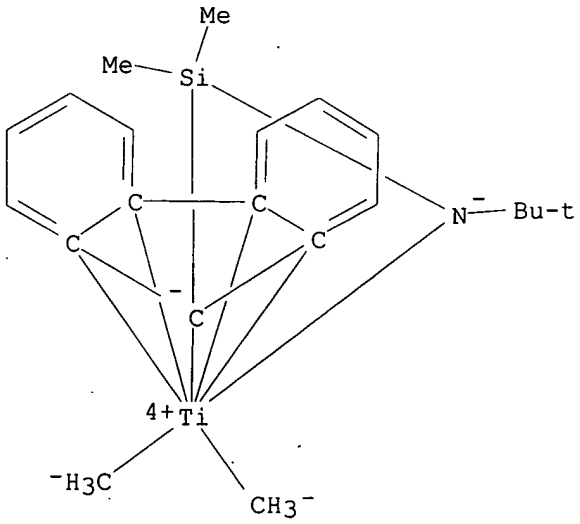
=> d L48 1-22 cbib abs hitind hitstr

L48 ANSWER 1 OF 22 HCA COPYRIGHT 2003 ACS on STN
138:338549 Living copolymerization of propene and .alpha.-olefins with Me2Sr(.theta.3-Flu)(tBuN)TiMe2-based catalysts. Shiono, Takeshi; Kanetaka, Ayako; Nishi-i, Kei; Ikeda, Tomiki (Chem. Resour. Lab., Tokyo Inst. of Technol., Yokohama, 226-8503, Japan). Polymeric Materials Science and Engineering, 84, 116-117 (English) 2001. CODEN: PMSEDG. ISSN: 0743-0515. Publisher: American Chemical Society.
AB We have previously found that [tert-butyl(dimethylfluorenylsilyl)amido]dim ethyltitanium can conduct **living polymn.** of propene combined with tris(pentafluorophenyl)borane at -50.degree. in a highly regiospecific manner. In this paper, we carried out copolymn. of propene with higher alpha-olefins or alpha, omega-diolefins to synthesize novel propene-based copolymers.
CC 35-3 (Chemistry of Synthetic High Polymers)
IT **Polymerization** catalysts
(**living; living** copolymn. of propene and .alpha.-olefins with Me2Sr(.eta.3-Flu)(tBuN)TiMe2-based catalysts)
IT **1109-15-5**, Tri(pentafluorophenyl)boron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(living copolymn. of propene and .alpha.-olefins with Me2Sr(.eta.3-Flu)(tBuN)TiMe2-based catalysts)

IT **1109-15-5**, Tri(pentafluorophenyl)boron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(living copolymn. of propene and .alpha.-olefins with Me2Sr(.eta.3-Flu)(tBuN)TiMe2-based catalysts)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 207728-92-5 HCA
CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



L48 ANSWER 2 OF 22 HCA COPYRIGHT 2003 ACS on STN
137:217307 propagation mechanism for **living polymerization** of olefins using [.eta.1:.eta.3-tert-butyl(dimethylfluorenylsilyl)amido]dimethyltitanium-based catalyst. Nishii, Kei; Shiono, Takeshi; Ikeda, Tomiki (Chemical Resources Laboratory, Tokyo Institute of Technology, Nagatsuta-cho Midori-ku Yokohama, 226-8503, Japan). Kobunshi Ronbunshu, 59(6), 371-376 (Japanese) 2002. CODEN: KBRBA3. ISSN: 0386-2186. Publisher: Kobunshi Gakkai.
AB 1-Octene polymn. was conducted by [.eta.1:.eta.3-tert-butyl(dimethylfluorenylsilyl)amido]dimethyltitanium ([t-BuNSiMe2Flu]TiMe2) activated with tris(pentafluorophenyl)borane (B(C6F5)3) at -50.degree.C in the presence of trioctylaluminum (Oct3Al). The polymer yield linearly increased with increasing polymn. time. The poly(1-octene) obtained showed narrow mol. wt. distributions (Mw/Mn) of about 1.1. In addn., the

no. av. mol. wt. (Mn) of the polymer was proportional to the polymer yield. **Living polymn.** of 1-octene proceeded with this catalyst system. The dependence of propagation rate on 1-octene concn. was investigated under various 1-octene concns. in the polymn. of low conversion (< 10%). The Mn values at a certain polymn. time were independent of 1-octene concns., which indicated that the propagation rate was almost zeroth order in 1-octene. Polymn. of 1-butene and 1-hexene with this catalyst system also proceeded in a living manner, and their propagation rates were also independent of monomer concn. 1-Octene polymn. was conducted by this catalyst system with various concns. of B(C6F5)3. The polymer yield and Mn value did not depend on the [B(C6F5)3]/[Ti] ratio and the polymers with narrow Mw/Mn were obtained. The results indicated that the propagation rate was not affected by excess B(C6F5)3.

CC 35-4 (Chemistry of Synthetic High Polymers)

ST butyldimethylfluorenylsilylamidodimethyltitanium catalyst olefin **living polymn** mechanism

IT **Polymerization** catalysts
(**living**; propagation mechanism for **living polymn.** of olefins using butyldimethylfluorenylsilylamido dimethyltitanium-based catalyst)

IT Polymerization catalysts
(metallocene; propagation mechanism for **living polymn** . of olefins using butyldimethylfluorenylsilylamido dimethyltitanium-based catalyst)

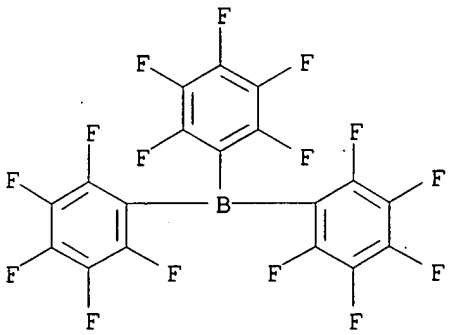
IT **1109-15-5**, Tripentafluorophenylboron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(propagation mechanism for **living polymn.** of olefins using butyldimethylfluorenylsilylamido dimethyltitanium-based catalyst)

IT 9003-07-0P, Polypropylene 9003-28-5P, 1-Butene **polymer** 25067-06-5P, 1-Hexene **polymer** 25068-25-1P, 1-Octene homopolymer
RL: SPN (Synthetic preparation); PREP (Preparation)
(propagation mechanism for **living polymn.** of olefins using butyldimethylfluorenylsilylamido dimethyltitanium-based catalyst)

IT **1109-15-5**, Tripentafluorophenylboron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(propagation mechanism for **living polymn.** of olefins using butyldimethylfluorenylsilylamido dimethyltitanium-based catalyst)

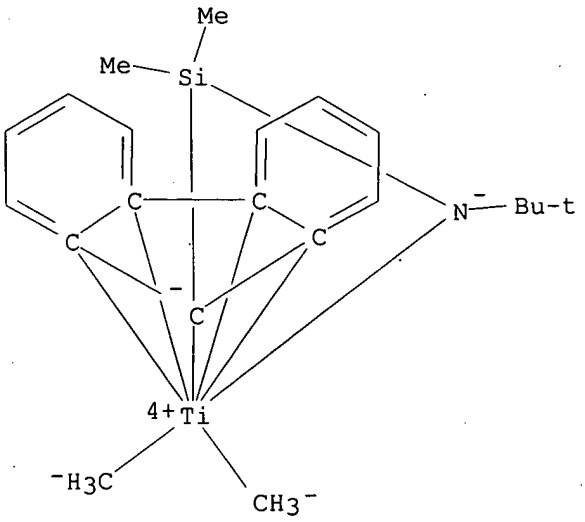
RN 1109-15-5 HCA

CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 207728-92-5 HCA

CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



L48 ANSWER 3 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:386622 Metallocene-catalyzed **living polymerization** of olefins, terminal modification therefor, and block copolymerization thereafter. Asai, Michihiko; Suzuki, Seizo; Miyazawa, Akira; Tsuchihara, Kenji; Hagiwara, Hideaki; Murata, Masahide; Ozaki, Hiroyuki; Kawabe, Masanao; Kase, Toshio; Te, Hwang Van; Jin, Jiju; Fukui, Yoshifumi (Sangyo Gijutsu Sogo Kenkyusho, Japan; Nippon Steel Chemical Co., Ltd.; Tonen Chemical Corp.; Nippon Zeon Co., Ltd.; Kanegafuchi Chemical Industry Co., Ltd.), Jpn. Kokai Tokkyo Koho JP 2002145927 A2 20020522, 23 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-340566 20001108.

AB In the process, C2-20 olefins are polymd. in the presence of polymn. catalysts comprising (A) 1-2 (/mol.)-**cyclopentadienyl**-contg. **Hf** compds., (B) BAr3 or B-Ar4X+ [Ar = (substituted) Ph; X+ = cation], and optionally (C) AlR3-nYn [R = C4-20 hydrocarbon; Y = halo, alkoxy, trialkylsiloxy, di(trialkylsilyl)amino, trialkylsilyl; n = 0-2] at -100-(-20).degree. to give **living polymers** of Mw/Mn 1-1.3. The polymers are halogenated to give halo-terminated polymers and then reacted with Group I, II, or III metal compds. to give metal-terminated polymers. The polymn. may be carried out at -100-(-60).degree. in the presence of (A') **Zr** analogs of A in place of A, or at -100-(-20).degree. in the presence of A', B, (D) **Ti** compds., and optionally C. Thus, 83 mmol propylene was polymd. in the presence of tri(n-octyl)aluminum, bis(**cyclopentadienyl**)zirconiumdimethyl, and tris(pentafluorophenyl)**borane** at -78.degree. and iodized to give I-terminated polypropylene satisfying Mw/Mn 1.19, 4.2 mmol of which was reacted with 9.0 mmol Cp*2Sm(THF)2 (Cp* = pentamethylcyclopentadiehyl) and then with 0.9 mmol Me methacrylate to give a block copolymer with Mw/Mn 1.12.

IC ICM C08F008-20
ICS C08F004-653; C08F297-06

CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29, 37

ST metallocene catalyzed **living polymn** polydispersity controlled; propylene block **polymn living** metallocene polyolefin; octylaluminum cyclopentenylmethylzirconium fluorophenylborane **living polymn** catalyst; methylcyclopentadiehylsamarium

catalyzed **living** polypropylene block **polymn**

IT Halogenation
(**living polymn.** catalysts; metallocene-catalyzed **living** polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

IT **Polymerization**
(**living**, metallocene catalyzed; metallocene-catalyzed living polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

IT **Polymerization** catalysts
(**living**, metallocene; metallocene-catalyzed living polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

IT **Polymers**, preparation
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(**living**, polyolefins, metallocene catalyzed; metallocene-catalyzed living polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

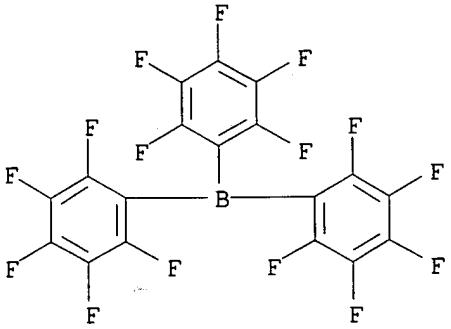
IT **Polymerization** catalysts
(metallocene, **living polymn.** catalysts; metallocene-catalyzed **living** polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

IT 1070-00-4, Tri(n-octyl)aluminum **1109-15-5**, Tris(pentafluorophenyl)**borane 12636-72-5**, **Biscyclopentadienylzirconiumdimethyl 37260-88-1**, **Biscyclopentadienylhafniumdimethyl 107333-47-1**, **Pentamethylcyclopentadienyltitaniumtrimethyl 132510-07-7**
RL: CAT (Catalyst use); USES (Uses)
(**living polymn.** catalysts; metallocene-catalyzed **living** polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

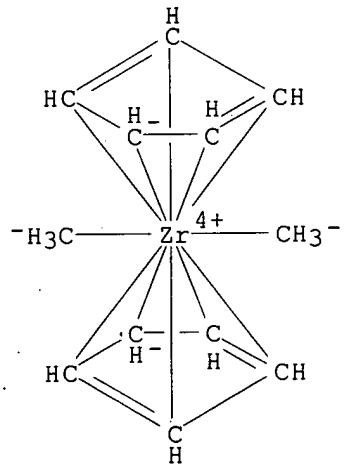
IT 130139-66-1
RL: CAT (Catalyst use); USES (Uses)
(racemic, **living polymn.** catalysts; metallocene-catalyzed **living** polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane** **12636-72-5**, **Biscyclopentadienylzirconiumdimethyl** **37260-88-1**, **Biscyclopentadienylhafniumdimethyl** **107333-47-1**, **Pentamethylcyclopentadienyltitaniumtrimethyl** **132510-07-7**
RL: CAT (Catalyst use); USES (Uses)
(**living polymn.** catalysts; metallocene-catalyzed **living** polyolefins and telechelics therefrom forming block copolymers with small polydispersity)

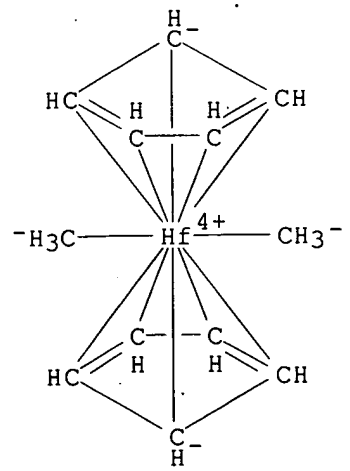
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



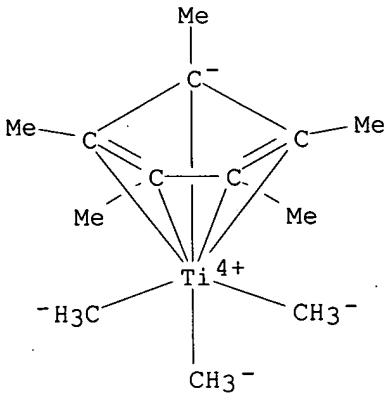
RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



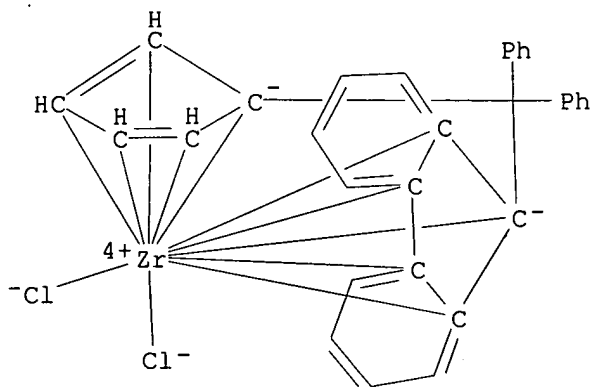
RN 37260-88-1 HCA
CN Hafnium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



RN 132510-07-7 HCA
CN Zirconium, dichloro[.eta.10-2,4-cyclopentadien-1-ylidene(diphenylmethylene)-9H-fluoren-9-ylidene]- (9CI) (CA INDEX NAME)



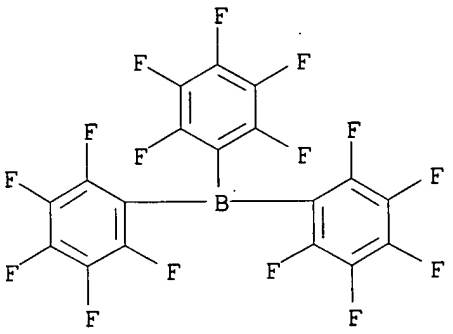
L48 ANSWER 4 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:370059 Amine phenolate catalysts for polymerization of alpha-olefins. Kol, Moshe; Tshuva, Edit Y.; Groisman, Stanislav; Segal, Sharon; Goldberg, Israel; Goldschmidt, Zeev (School of Chemistry, Tel Aviv University, Tel Aviv-Jaffa, 69978, Israel). Polymeric Materials Science and Engineering, 86, 304-305 (English) 2002. CODEN: PMSEDG. ISSN: 0743-0515. Publisher: American Chemical Society.

AB Amine-diphenolate complexes of Cs-symmetry lead to atactic polymn. of .alpha.-olefins, in the presence of tris(pentafluorophenyl)**borane** as co-catalyst. By varying the (group IV) metal (**Zr**, **Hf**, **Ti**) and having a donor group on the side arm of the ligand, the reactivity of the resulting catalyst and the properties of the polymer may be controlled. The catalyst mechanism was also studied for complexes of diamine-diphenolate ligands. These ligands wrap around the metal to afford C2-sym. complexes in which the two labile positions are in cis-geometry, and are thus **cyclopentadienyl**-free analogs of the ansa-metallocene catalysts. Oligomerization catalysts, **living polymn.** catalysts, extremely reactive catalysts, and isotactic and

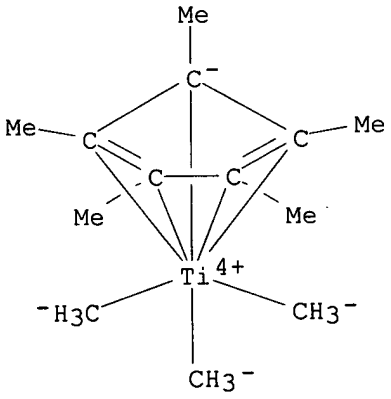
living polymn. catalysts are described.
CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67, 78
ST amine diphenolate **zirconium hafnium** catalyst olefin polymn; pentafluorophenylborane cocatalyst olefin polymn amine phenolate complex; **titanium** amine diphenolate catalyst polyolefin tacticity; stereoselective polymn catalyst amine phenolate ligand
IT 1109-15-5, Tris(pentafluorophenyl)**borane**
RL: CAT (Catalyst use); USES (Uses)
(co-catalyst; ligand effects on activity and stereo-selectivity of amine phenolate catalysts in polymn. of alpha-olefins)
IT 7440-58-6D, **Hafnium**, amine-diphenolate complexes 7440-67-7D, **Zirconium**, amine-diphenolate complexes 388114-74-7
RL: CAT (Catalyst use); USES (Uses)
(ligand effects on activity and stereo-selectivity of amine phenolate catalysts in polymn. of alpha-olefins)
IT 24356-01-2, Tetrabenzyl **zirconium** 375793-61-6 375793-64-9
RL: RCT (Reactant); RACT (Reactant or reagent)
(ligand effects on activity and stereo-selectivity of amine phenolate catalysts in polymn. of alpha-olefins)

L48 ANSWER 5 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:341067 Syndiospecific living block copolymerization of styrenic monomers containing functional groups, and preparation of syndiotactic poly{(4-hydroxystyrene)-block-[(4-methylstyrene)-co-(4-hydroxystyrene)]}.
Kawabe, Masanao; Murata, Masahide (Joint Research Center for Precision Polymerization, Japan Chemical Innovation Institute, Tsukuba, 305-8565, Japan). Macromolecular Chemistry and Physics, 203(1), 24-30 (English) 2002. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Wiley-VCH Verlag GmbH.
AB At -25.degree.C, the sequential block copolymns. of 4-(tert-butyldimethylsilyloxy)styrene (TBDMSS) and 4-methylstyrene (4MS) were investigated by using a syndiospecific **living polymn.** catalyst system composed of (trimethyl)pentamethylcyclopentadienyltitanium (Cp*TiMe3), trioctylaluminum (AlOct3) and tris(pentafluorophenyl)borane (B(C6F5)3). The no.-av. mol. wt. (.hivin.Mn) of the poly(TBDMSS)s increased linearly with increasing the polymer yield up to almost 100 wt-% consumption of TBDMSS used as 1st monomer. The .hivin.Mn value of the polymer after the second monomer (4MS) addn. continued to increase proportionally to the polymer yield. The mol. wt. distributions (MWDs) of the polymers remained const. at around 1.05-1.18 over the entire course of block copolymn. It was concluded that the block copolymns. of TBDMSS and 4MS with the Cp*TiMe3/B(C6F5)3/AlOct3 catalytic system proceeded with a high block efficiency. The 13C NMR anal. clarified that the block copolymers obtained in this work had highly syndiotactic structure. By the deprotection reaction of silyl group with conc, hydrochloric acid (HCl), syndiotactic poly{(4-hydroxystyrene)-block-[(4-methylstyrene)-co-(4-hydroxystyrene)]} was successfully prepd.
CC 35-4 (Chemistry of Synthetic High Polymers)
IT **Polymerization**
(syndiospecific **living** block copolymn. of styrenic monomers)
IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Trimethyl)pentamethylcyclopentadienyltitanium
RL: CAT (Catalyst use); USES (Uses)
(**polymn.** catalyst; syndiospecific **living** block copolymn. of styrenic monomers)
IT **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Trimethyl)pentamethylcyclopentadienyltitanium
RL: CAT (Catalyst use); USES (Uses)
(**polymn.** catalyst; syndiospecific **living** block

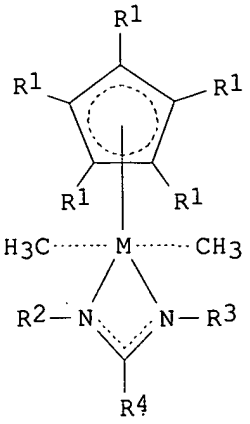
copolymn. of styrenic monomers)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



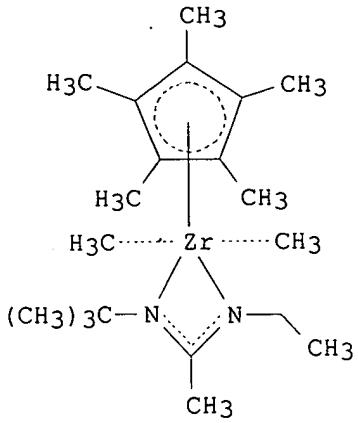
RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



L48 ANSWER 6 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:310305 Stereospecific **living polymerization** of olefins by a novel Ziegler-Natta catalyst compositions. Sita, Lawrence R.; Jayaratne, Kumudini C. (USA). U.S. Pat. Appl. Publ. US 20020045536 A1 20020418, 18 pp., Cont.-in-part of Appl. No. PCT/US00/000328. (English). CODEN: USXXCO. APPLICATION: US 2001-849244 20010507. PRIORITY: US 1999-PV162037 19991028; WO 2000-US328 20000107.
GI



I



II

AB An olefin polymn. pre-catalyst and a method for prepg. an activated olefin polymn. catalyst compn. from the pre-catalyst are disclosed in formula (I): wherein M = **Zr** of **Hf**; R1 = independently hydrogen or alkyl or two adjacent R1 form an arom. ring; and R2, R3, R4= independently alkyl, cycloalkyl, Ph, or optionally substituted Ph with proviso that R2 and R3 are not the same with activating co-catalyst having the formula [A+][BR54-] or BR53 wherein A+ = cationic Lewis or Bronsted acid capable of abstracting a Me from the pre-catalyst, B = boron, and R5 = Ph or optionally substituted Ph. Thus, 0.5 g Cp*ZrMe3 in 10 mL pentane and 0.23 g 1-tert-Bu, 3-ethylcarbodiimide in 10 mL pentane were stirred for 18 h to give a pre-catalyst (II), 25 .mu.mol of which dissolved in 4 mL chlorobenzene was activated by [PhNMe2H][B(C6F5)4] in 4 mL chlorobenzene at -35.degree., 2 mL 1-hexene was polymd. showing activity 110 g polymer/mmol cat-h, Mn 32,572, and Mw/Mn = 1.50.

IC ICM B01J031-00
NCL 502104000
CC 35-3 (Chemistry of Synthetic High Polymers)
ST stereospecific **living polymn** olefin ziegler natta catalyst
IT Polymerization catalysts
(Ziegler-Natta; stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)
IT **Polymerization** catalysts
(**living**; stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)
IT 118612-00-3, **Borate**(1-), tetrakis(pentafluorophenyl)-, hydrogen, compd. with N,N-dimethylbenzenamine (1:1)
RL: CAT (Catalyst use); USES (Uses)
(cocatalyst; stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)
IT 25498-06-0P, Cyclohexane, ethenyl-, homopolymer 337363-26-5P, Cyclohexane, ethenyl-, polymer with 1-hexene, block
RL: IMF (Industrial manufacture); PREP (Preparation)
(isotactic; stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)
IT 259824-47-0, **Zirconium**, (N,N'-dicyclohexylethanimidamidato-.kappa.N,.kappa.N')dimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-**cyclopentadien**-1-yl]- 259824-48-1, **Zirconium**, [N-(1,1-dimethylethyl)-N'-ethylethanimidamidato-.kappa.N,.kappa.N']dimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-**cyclopentadien**-1-yl]-

RL: CAT (Catalyst use); USES (Uses)
(pre-catalyst; stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)

IT 25067-06-5P, 1-Hexene homopolymer
RL: IMF (Industrial manufacture); PREP (Preparation)
(stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)

IT 538-75-0, Dicyclohexylcarbodiimide 81476-64-4, **Zirconium**, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-**cyclopentadien**-1-yl]- 337363-25-4, Ethanimidamide, N-(1,1-dimethylethyl)-N'-ethyl-
RL: RCT (Reactant); RACT (Reactant or reagent)
(stereospecific **living polymn**. of olefins by novel Ziegler-Natta catalyst compns.)

L48 ANSWER 7 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:135097 Syndiospecific **living polymerization** of silyl-protected hydroxystyrene derivatives and preparation of syndiotactic poly(4-hydroxystyrene) with narrow molecular weight distribution. Kawabe, Masanao; Murata, Masahide (Joint Research Center for Precision Polymerization, Japan Chemical Innovation Institute, Tsukuba, 305-8565, Japan). Macromolecular Chemistry and Physics, 202(16), 3157-3164 (English) 2001. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Wiley-VCH Verlag GmbH.

AB At -25.degree.C, the polymns. of hydroxystyrene, the phenolic -OH of which was protected with trialkylsilyl compds., were investigated by using a syndiospecific **living polymn**. catalyst system composed of (trimethyl)**pentamethylcyclopentadienyltitanium** (Cp*TiMe3), trioctylaluminum (AlOct3) and tris(pentafluorophenyl)**borane** (B(C6F5)3). The use of bulky trialkylsilyl protective groups was effective to control a stereoregularity and a mol. wt. distribution (MWD) of polymer. In the case of 4-(tert-butyldimethylsilyloxy)styrene (TBDMSS) monomer, the no.-av. mol. wts. (Mo's) of polymer produced increased proportionally with increasing of monomer conversion. The MWD of polymer stayed narrow (Mw/Mo = 1.05-1.15). It was concluded, thus, the polymns. of TBDMSS with Cp*TiMe3/B(C6F5)3/AlOct3 catalytic system proceeded under living fashion. The 13C NMR anal. clarified that the polymers obtained in this work had highly syndiotactic structure. By the deprotection reaction of silyl group with conc, hydrochloric acid (HCl), syndiotactic poly(4-hydroxystyrene) (PHOST) with narrow MWD was prepd. The obtained syndiotactic PHOST had a good soly. for polar solvents and a high glass transition temp. (Tg) of 194.degree.C.

CC 35-4 (Chemistry of Synthetic High Polymers)

ST silyl protected hydroxystyrene syndiospecific **living polymn**

IT Polymerization catalysts
(metallocene; syndiospecific **living polymn**. of silyl-protected hydroxystyrene derivs.)

IT 107333-47-1, Trimethyl(**pentamethylcyclopentadienyl**)**titanium**
RL: CAT (Catalyst use); USES (Uses)
(syndiospecific **living polymn**. of silyl-protected hydroxystyrene derivs.)

IT 2628-17-3, 4-Hydroxystyrene 6485-79-6, Triisopropylsilane
RL: RCT (Reactant); RACT (Reactant or reagent)
(syndiospecific **living polymn**. of silyl-protected hydroxystyrene derivs.)

IT 137837-67-3P 324522-84-1DP, hydrolyzed 324522-84-1P 352675-60-6P
RL: SPN (Synthetic preparation); PREP (Preparation)
(syndiospecific **living polymn**. of silyl-protected

hydroxystyrene derivs.)

L48 ANSWER 8 OF 22 HCA COPYRIGHT 2003 ACS on STN
136:70140 Syndiospecific **living polymerization** of 4-methylstyrene and styrene with (trimethyl) **pentamethylcyclopentadienyltitanium**/tris(pentafluorophenyl) **borane**/trioctylaluminum catalytic system. Kawabe, Masanao; Murata, Masahide (Joint Research Center for Precision Polymerization, Japan Chemical Innovation Institute, Tsukuba, 305-8565, Japan). Journal of Polymer Science, Part A: Polymer Chemistry, 39(21), 3692-3706 (English) 2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley & Sons, Inc..

AB The polymns. of styrene and 4-methylstyrene (4MS) with a half-metallocene type catalytic system composed of (trimethyl) **pentamethylcyclopentadienyltitanium** (Cp*TiMe3), trioctylaluminum (AlOct3), and tris(pentafluorophenyl)-**borane** [B(C6F5)3] were investigated at -25.degree.C. The addn. of AlOct3 as a third component of the catalytic system is effective both to promote the syndiospecific polymn. and to inhibit the nonstereospecific polymn. at the low-temp. region. The use of AlOct3 was also effective to eliminate the chain transfer reaction to alkylaluminum. The no.-av. mol. wts. (Mn's) of poly(4MS) or polystyrene increased proportionally with increasing monomer conversion. The mol. wt. distribution (MWD) of polymer stayed narrow [Mu/Mn = .apprx. 1.1 for poly(4MS) and Mu/Mn = .apprx. 1.5 for polystyrene]. It was thus concluded that the polymns. of the styrenic monomers with Cp*TiMe3/B(C6F5)3/AlOct3 catalytic system proceeded under living fashion at -25.degree.C. The living random copolymn. behaviors of styrene and 4MS were also confirmed. The 13C NMR anal. clarified that each of the homopolymers and random copolymers obtained in this work had highly syndiotactic structure.

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29

ST syndiospecific **living polymn** catalyst methylstyrene styrene; **titanium borane** trioctylaluminum catalyst polymn styrene

IT **Polymerization** catalysts
(**living**; syndiospecific **living polymn**. of methylstyrene and styrene with (trimethyl) **pentamethylcyclopentadienyltitanium**-tris(pentafluorophenyl) **borane**-trioctylaluminum catalytic system)

IT Reactivity ratio in polymerization
(of methylstyrene and styrene with (trimethyl) **pentamethylcyclopentadienyltitanium**-tris(pentafluorophenyl) **borane**-trioctylaluminum catalytic system)

IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(pentafluorophenyl) **borane 107333-47-1**, (Trimethyl) **pentamethylcyclopentadienyltitanium**
RL: CAT (Catalyst use); USES (Uses)
(catalysts; syndiospecific **living polymn**. of methylstyrene and styrene with (trimethyl) **pentamethylcyclopentadienyltitanium**-tris(pentafluorophenyl) **borane**-trioctylaluminum catalytic system)

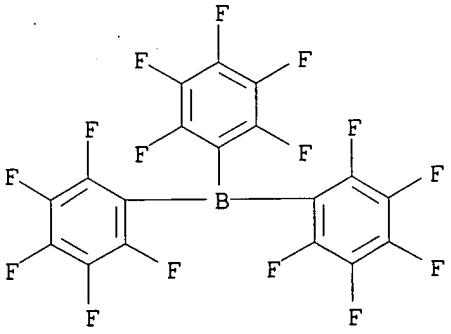
IT 100-42-5, Styrene, reactions 622-97-9, 4-Methylstyrene
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)
(reactivity ratio in polymn. of methylstyrene and styrene with (trimethyl)**pentamethylcyclopentadienyltitanium** -tris(pentafluorophenyl)**borane**-trioctylaluminum catalytic system)

IT 9003-53-6P, Polystyrene 24936-41-2P, 4-Methylstyrene homopolymer 26655-84-5P, 4-Methylstyrene-styrene copolymer

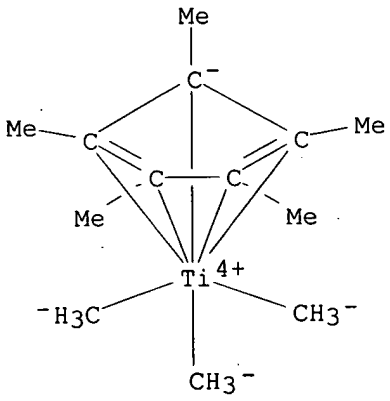
RL: SPN (Synthetic preparation); PREP (Preparation)
(syndiospecific **living polymn.** of methylstyrene and styrene with (trimethyl)**pentamethylcyclopentadienyltitanium** -tris(pentafluorophenyl)**borane**-trioctylaluminum catalytic system)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
107333-47-1, (Trimethyl)**pentamethylcyclopentadienyltitanium**** *
RL: CAT (Catalyst use); USES (Uses)
(catalysts; syndiospecific ***living polymn. of methylstyrene and styrene with (trimethyl) **pentamethylcyclopentadienyltitanium**-tris(pentafluorophenyl) **borane**-trioctylaluminum catalytic system)

RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



L48 ANSWER 9 OF 22 HCA COPYRIGHT 2003 ACS on STN
135:273336 Synthesis of block graft copolymer with syndiospecific **living polymerization** of styrene derivatives by (trimethyl)**pentamethylcyclopentadienyltitanium** /tris(pentafluorophenyl)**borane**/trioctylaluminium catalytic system. Kawabe, Masanao; Murata, Masahide (Joint Research Center for Precision Polymerization, Japan Chemical Innovation Institute, Tsukuba, Ibaraki, 305-8565, Japan). Macromolecular Chemistry and Physics, 202(9), 1799-1805 (English) 2001. CODEN: MCHPES. ISSN: 1022-1352. Publisher:

Wiley-VCH Verlag GmbH.

AB Two kinds of syndiotactic AB type block copolymers were prepd., which were (1) poly(4-methylstyrene)-block-polystyrene {Poly(4MS-b-S), (A: poly(4-MS), B: polystyrene (S))}, (2) poly(4-methylstyrene)-block-poly(styrene-co-3-methylstyrene) {poly[4MS-b-(S-co-3MS)] (A: poly(4MS), B: styrene/3-methylstyrene (3MS) copolymer)}. For the syntheses of these diblock copolymers, the **living polymn.** catalytic system composed of (trimethyl)**pentamethylcyclopentadienyltitanium** (Cp*TiMe3) premixed with trioctylaluminum (AlOct3), and tris(pentafluorophenyl)**borane** (B(C6F5)3) was used at -25 .degree.C. Chlorination of the Me groups of poly[4MS-b-(S-co-3MS)] was conducted by aq. sodium hypochlorite (NaOCl) and phase-transfer catalyst such as tetrabutylammonium hydrogen sulfate (TBAHS). The novel tapered densely grafted diblock copolymer was synthesized by coupling reaction of living poly(2-vinyl pyridine)lithium (Poly(2VP)Li) with the partly chloromethylated poly[4MS-b-(S-co-3MS)].

CC 35-8 (Chemistry of Synthetic High Polymers)

ST block graft styrene methylstyrene vinylpyridine copolymer; **living polymn** catalyst **titanium borane** aluminum; syndiotactic **living** block graft **polymn**

IT **Polymerization** catalysts
(**living**; synthesis of block graft copolymers by syndiospecific **living polymn.** of styrene derivs. with (trimethyl)**pentamethylcyclopentadienyltitanium** /tris(pentafluorophenyl)**borane**/trioctylaluminum catalysts)

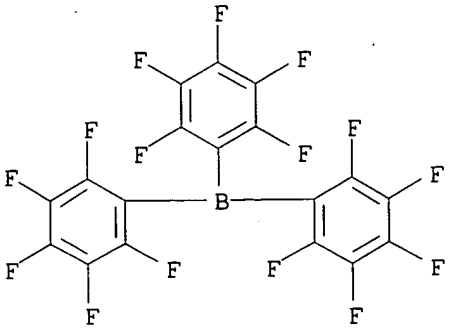
IT 352675-61-7P, 3-Methylstyrene-4-methylstyrene-styrene-2-vinylpyridine block graft copolymer 352706-32-2DP, 3-Methylstyrene-4-methylstyrene-styrene syndiotactic block copolymer, chlorinated 352707-00-7P, 4-Methylstyrene-styrene syndiotactic block copolymer
RL: SPN (Synthetic preparation); PREP (Preparation)
(diblock; synthesis of block graft copolymers by syndiospecific **living polymn.** of styrene derivs. with (trimethyl) **pentamethylcyclopentadienyltitanium**/tris(pentafluorophenyl) **borane**/trioctylaluminum catalysts)

IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(pentafluorophenyl) **borane 107333-47-1**, (Trimethyl) **pentamethylcyclopentadienyltitanium**
RL: CAT (Catalyst use); USES (Uses)
(synthesis of block graft copolymers by syndiospecific **living polymn.** of styrene derivs. with (trimethyl) **pentamethylcyclopentadienyltitanium**/tris(pentafluorophenyl) **borane**/trioctylaluminum catalysts)

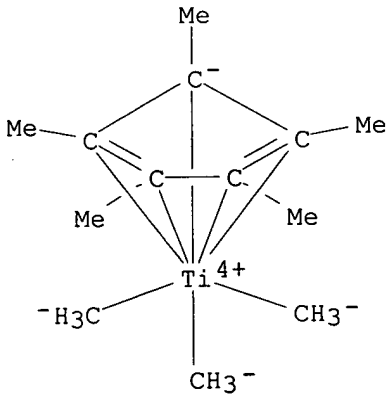
IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
107333-47-1, (Trimethyl)**pentamethylcyclopentadienyltitanium****
*
RL: CAT (Catalyst use); USES (Uses)
(synthesis of block graft copolymers by syndiospecific ***living polymn. of styrene derivs. with (trimethyl) **pentamethylcyclopentadienyltitanium**/tris(pentafluorophenyl) **borane**/trioctylaluminum catalysts)

RN 1109-15-5 HCA

CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



L48 ANSWER 10 OF 22 HCA COPYRIGHT 2003 ACS on STN
135:257508 **Living**-like **polymerization** of propylene with mixed metallocene catalyst systems. Fukui, Yoshifumi; Murata, Masahide (JRCPP, JCII, Tsukuba, Ibaraki, 305-8565, Japan). Macromolecular Chemistry and Physics, 202(9), 1473-1477 (English) 2001. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Wiley-VCH Verlag GmbH.

AB Propylene polymn. was conducted with the Cp2ZrHCl/B(C6F5)3/[tBuNSiMe2Flu]TiMe2 catalyst system with AlOct3 as a scavenger at -50.degree.C. The polymer obtained displayed a bimodal molar mass distribution. It could be confirmed that the polymer with higher .hivin.Mn was produced from **Zr** active sites and the polymer with lower .hivin.Mn resulted from **Ti** active sites. In both fractions, .hivin.Mn was increased linearly with increasing polymn. time. The MWD (.hivin.Mw/.hivin.Mn) values of each fraction were around 1.1. Thus, it could be said that propylene **polymn**. proceeded in a **living** manner even with zirconocene active species by using the mixed metallocene system. The **living**-like **polymn**. of propylene with Cp2ZrMe2/B(C6F5)3/Cp*TiCl3 was also demonstrated at -50.degree.C. Under the reaction between carbon monoxide (CO) and this living polypropylene (PP) at -78 .degree.C, it could be found that CO was quant. incorporated into living PP.

CC 35-3 (Chemistry of Synthetic High Polymers)
ST **living polymn** propylene mixed metallocene catalyst
IT **Polymerization** catalysts

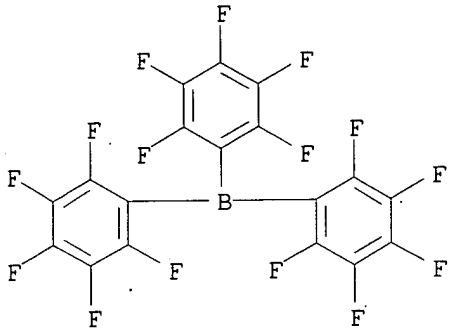
(metallocene; **living**-like **polymn**. of propylene with mixed metallocene catalyst systems)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane** 1270-98-0, Trichloro(**cyclopentadienyl**)**titanium** **1291-32-3** **12636-72-5**, Bis(**cyclopentadienyl**)Dimethylzirconium **37342-97-5** 177716-54-0
RL: CAT (Catalyst use); USES (Uses)
(**living**-like **polymn**. of propylene with mixed metallocene catalyst systems)

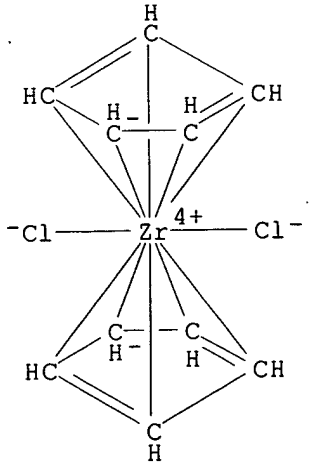
IT 9003-07-0P, Polypropylene
RL: SPN (Synthetic preparation); PREP (Preparation)
(**living**-like **polymn**. of propylene with mixed metallocene catalyst systems)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane** **1291-32-3** **12636-72-5**, Bis(**cyclopentadienyl**)Dimethylzirconium **37342-97-5**
RL: CAT (Catalyst use); USES (Uses)
(**living**-like **polymn**. of propylene with mixed metallocene catalyst systems)

RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)

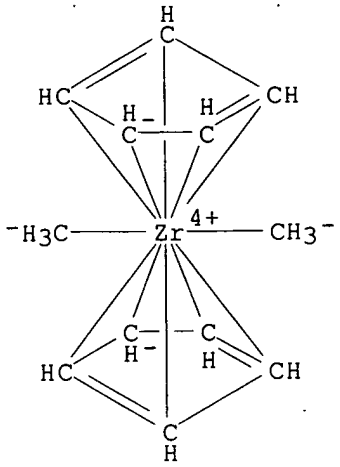


RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)

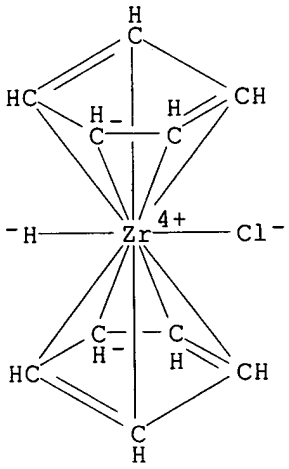


RN 12636-72-5 HCA

CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



RN 37342-97-5 HCA
CN Zirconium, chlorobis(.eta.5-2,4-cyclopentadien-1-yl)hydro- (9CI) (CA INDEX NAME)



L48 ANSWER 11 OF 22 HCA COPYRIGHT 2003 ACS on STN
135:61604 Syndiospecific **Living Polymerization** of Propene with [t-BuNSiMe2Flu]TiMe2 Using MAO as Cocatalyst. Hasan, Tariqul; Ioku, Atau; Nishii, Kei; Shiono, Takeshi; Ikeda, Tomiki (Chemical Resources Laboratory, Tokyo Institute of Technology, Midori-ku Yokohama, 226-8503, Japan). Macromolecules, 34(10), 3142-3145 (English) 2001. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB Propene polymn. was conducted at 0 .degree.C by [t-BuNSiMe2Flu]TiMe2 combined with B(C6F5)3, MAO, or the MAO which had been dried in a vacuum and washed with hexane before use. The effect of cocatalyst was investigated under atm. pressure of propene in a semibatch system where polymn. rate was followed by the amt. of propene consumed. The B(C6F5)3 system was deactivated within 30 min, while the MAO system showed steady polymn. rate. On the other hand, the activity of the dried MAO system was

so high that the kinetic profile could not be evaluated precisely. The MAO system gave the low mol. wt. polymer, and the no. of polymer chains was more than 10 times higher than the amt. of titanium complex employed. In the dried MAO system, however, the produced polymer showed the highest mol. wt. and narrowest mol. wt. distributions of about 1.2. The batchwise polymn. with the dried MAO system indicated that propene polymn. proceeded quant. regardless of the monomer charged, and the no.-av. mol. wt. of the polymer obtained increased linearly against the polymer yield with keeping the mol. wt. distribution narrow and the no. of polymer chains const. The results of postpolymn. testified that **living polymn.** proceeded under these conditions. The 13C NMR measurement indicated that syndiotactic-rich polypropenes were produced in a highly regiospecific manner by this catalyst system.

CC 35-3 (Chemistry of Synthetic High Polymers)

ST syndiospecific **living polymn** propene titanium methylaluminoxane catalyst; microstructure polypropylene catalyst syndiospecific

IT Aluminoxanes
RL: CAT (Catalyst use); USES (Uses)
(Me; syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

IT **Polymerization** catalysts
(**living**, syndiospecific; syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

IT **Polymer** chains
(syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(perfluorophenyl)borane **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

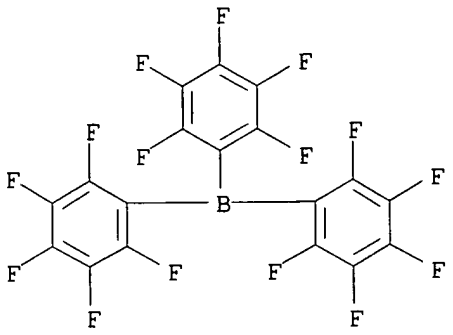
IT 115-07-1, Propene, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

IT 9003-07-0P, Polypropylene
RL: SPN (Synthetic preparation); PREP (Preparation)
(syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

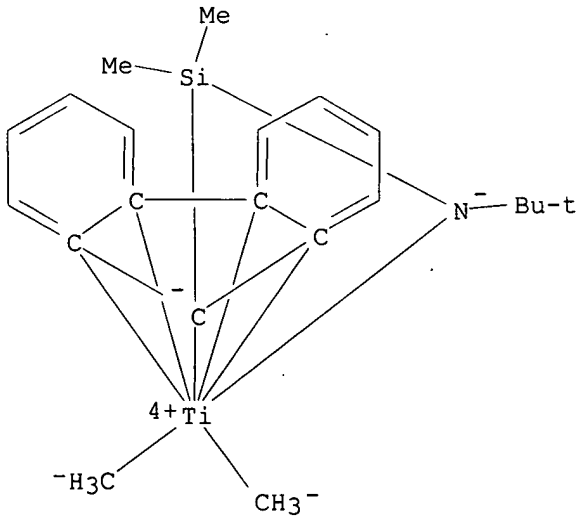
IT **1109-15-5**, Tris(perfluorophenyl)borane **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(syndiospecific **living polymn**. of propene with [t-BuNSiMe2Flu]TiMe2 using methylaluminoxanes as cocatalyst)

RN 1109-15-5 HCA

CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 207728-92-5 HCA
CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



L48 ANSWER 12 OF 22 HCA COPYRIGHT 2003 ACS on STN
134:208203 Effect of cocatalyst in 1-hexene polymerization by Cp*TiMe2(O-2,6-iPr2C6H3) complex. Nomura, K.; Komatsu, T.; Nakamura, M.; Imanishi, Y. (Graduate School of Materials Science, Nara Institute of Science and Technology (NAIST), Ikoma, Nara, 630-0101, Japan). Journal of Molecular Catalysis A: Chemical, 164(1-2), 131-135 (English) 2000. CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier Science B.V..

AB Since Cp*TiMe2(O-2,6-iPr2C6H3) (2) exhibited higher initial catalytic activity than Cp*TiCl2(O-2,6-iPr2C6H3) (1) for 1-hexene polymn. in the presence of MAO, the effect of cocatalyst for the polymn. was investigated at low temp. (0 to -30.degree.C). The use of AliBu3/Ph3CB(C6F5)4 was effective to improve the activity and a notable increase in the activity was obtained if 2 was pre-treated with 2 equiv of AliBu3 in advance. TON (Turnover no.) of 18 100 (activity: 5710 kg-polymer/mol-**Ti** h) could be attained after 16 min under the optimized conditions and the Mn value for the resultant poly(1-hexene) increased upon the consumption of 1-hexene suggesting the possibility of **living polymn.**

CC 35-3 (Chemistry of Synthetic High Polymers)
ST hexene polymn catalyst **cyclopentadienyl** dimethyl **titanium** aluminoxane

IT 136040-19-2, Triphenylcarbonium tetrakis(pentafluorophenyl)**borate**
207740-63-4
RL: CAT (Catalyst use); USES (Uses)
(effect of cocatalyst in 1-hexene polymn. by Cp*TiMe2(O-2,6-iso-Pr2C6H3) complex)

L48 ANSWER 13 OF 22 HCA COPYRIGHT 2003 ACS on STN
133:363134 Modified end group-containing syndiotactic styrene polymers and their manufacture. Kawabe, Masanao; Murata, Masahide; Kase, Toshio; Ozaki, Hiroyuki; Fukui, Yoshifumi; Hagiwara, Hideaki; Jiju, Jin; Miyasawa, Tetsu; Tsuchihara, Kenji; Suzuki, Seizo; Asai, Michihiko; Soga, Kazuo (Agency for Industrial Science and Technology, Japan; Zaidan Hojin Kagaku Gijitsu Senryakusuishin Kiko). Jpn. Kokai Tokkyo Koho JP 2000319319 A2 20001121, 18 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-129256 19990510.

AB The polymers contain .gtoreq.1 R1mC6H4CHCH2 (R1 = H, halo, C1-30 hydrocarbyl, O, N, S, P, Se, Si, Pb; m = 0-5) structural units and show .gtoreq.30% racemic pentad syndiotacticity of Ph C1 carbon detd. by C13-NMR, 1000 .ltoreq. Mn .ltoreq. 10,000,000, Mw/Mn .ltoreq. 2.5, and introduction of functional groups onto end groups .gtoreq.30%. The polymers are manufd. by (1) treating (A) MR1aR2bR3cX14-(a+b+c) and/or MR1dR2eX13-(d+e) [R1-R3 = H, C1-20 alkyl, etc.; M = Ti, Zr, Hf; X1 = halo; a-c = 0-4; d, e = 0-3] with (B) .gtoreq.1 cocatalysts chosen from organoaluminumoxy compds., ionic compds., Lewis acids, and organometallic compds. of Group 1, 2, and 13 metals from -50 to 50.degree. for 5 s - 10 h, (2) polymg. R1mC6H4CH:CH2 (R1, m = same as above), and (3) treating modifiers with **living polymers** having the transition metals on their end groups. Thus, p-methylstyrene was polymd. in the presence of trioctylaluminum, (trimethyl)pentamethylcyclopentadienyl titanium, tris(pentafluorophenyl)boron and reacted with tert-Bu isocyanate to give a polymer showing Mw 35,200, Mn 28,400, .gtoreq.95% racemic pentad syndiotacticity, and introduction of functional groups onto end groups 94.3%.

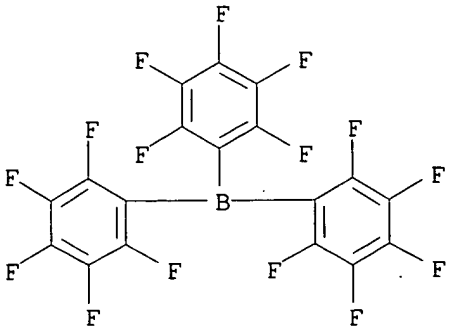
IC ICM C08F008-00
ICS C08F004-64; C08F012-08

CC 35-4 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67

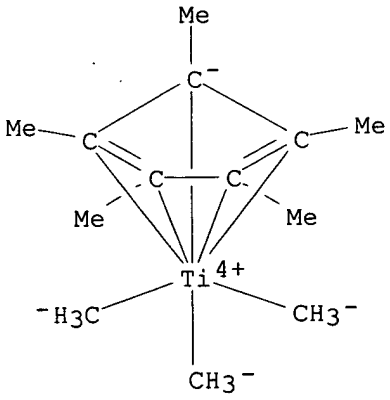
IT 1070-00-4, Trioctylaluminum **1109-15-5**,
Tris(pentafluorophenyl)boron **107333-47-1**,
(Trimethyl)pentamethylcyclopentadienyl titanium
RL: CAT (Catalyst use); USES (Uses)
(catalyst; manuf. of modified end group-contg. syndiotactic styrene polymers)

IT **1109-15-5**, Tris(pentafluorophenyl)boron **107333-47-1**,
(Trimethyl)pentamethylcyclopentadienyl titanium
RL: CAT (Catalyst use); USES (Uses)
(catalyst; manuf. of modified end group-contg. syndiotactic styrene polymers)

RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



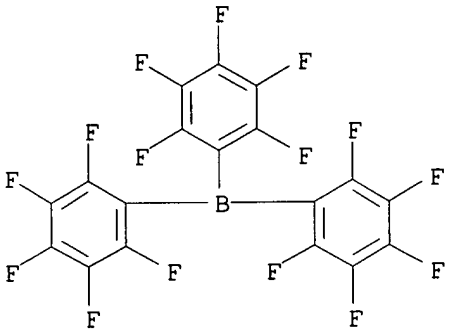
RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



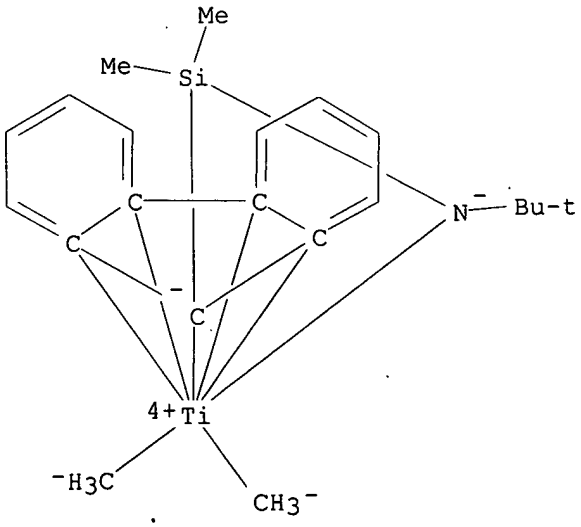
L48 ANSWER 14 OF 22 HCA COPYRIGHT 2003 ACS on STN
133:335569 Additive effects of trialkylaluminum on propene polymerization with (t-BuNSiMe2Flu)TiMe2-based catalysts. Shiono, T.; Yoshida, S.; Hagihara, H.; Ikeda, T. (Chemical Resources Laboratory, Tokyo Institute of Technology, Yokohama, 226-8503, Japan). Applied Catalysis, A: General, 200(1-2), 145-152 (English) 2000. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..

AB Propene polymn. was conducted by [.eta.5:.eta.1-tert-butyl(dimethylfluorenylsilyl)amido]dimethyltitanium combined with B(C6F5)3 or methylaluminoxane (MAO) as a cocatalyst in the presence or absence of various trialkylaluminums: Me3Al, Et3Al, iBu3Al (triisobutylaluminum) and Oct3Al (trioctylaluminum). In the case of **living polymn**. with B(C6F5)3 at -50, addn. of Oct3Al and Et3Al increased the propagation rate. Et3Al also acted as a chain transfer reagent and selectively gave Al-terminated polymers, while Oct3Al induced chain transfer reaction only in high concn. Little polymer was obtained in the presence of Me3Al or iBu3Al. When MAO was used as a cocatalyst, polymn. did not proceed at -50.degree.C. The MAO system, however, showed high activity at 40.degree.C and selectively gave low mol. wt. polymers terminated with Al-C bonds. Contrary to the low temp. polymn. with B(C6F5)3 at -50.degree.C, the polymer yield was enhanced by the addn. of Me3Al and iBu3Al, while the mol. wt. was reduced by Me3Al and enlarged by iBu3Al. On the other hand, Et3Al and Oct3Al significantly decreased both the polymer yield and the mol. wt. under these conditions. Additive

effects of trialkylaluminums were strongly dependent on polymn. temp. as well as on the structure of the alkyl group.
CC 35-6 (Chemistry of Synthetic High Polymers)
IT **1109-15-5**, Tripentafluorophenylboron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(additive effects of trialkylaluminum on propene polymn. with (t-BuNSiMe2Flu)TiMe2-based catalysts)
IT **1109-15-5**, Tripentafluorophenylboron **207728-92-5**
RL: CAT (Catalyst use); USES (Uses)
(additive effects of trialkylaluminum on propene polymn. with (t-BuNSiMe2Flu)TiMe2-based catalysts)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 207728-92-5 HCA
CN Titanium, [N-(1,1-dimethylethyl)-1-[(4a,4b,8a,9,9a-.eta.)-9H-fluoren-9-yl]-1,1-dimethylsilanaminato(2-)-.kappa.N]dimethyl- (9CI) (CA INDEX NAME)



L48 ANSWER 15 OF 22 HCA COPYRIGHT 2003 ACS on STN
131:337455 Syndiospecific **living polymerization** of 4-methylstyrene with (trimethyl)pentamethylcyclopentadienyltitanium/tris(pentafluorophenyl)borane/trioctylaluminium catalytic system. Kawabe, Masanao; Murata, Masahide; Soga, Kazuo (Joint Research Center Precision Polymerization, Japan Chemical Innovation Institute, Tsukuba, 305, Japan). Macromolecular Rapid Communications, 20(11), 569-572 (English) 1999.

CODEN: MRCOE3. ISSN: 1022-1336. Publisher: Wiley-VCH Verlag GmbH.

AB The polymn. of 4-methylstyrene with the (trimethyl)pentamethylcyclopentadienyltitanium (Cp*TiMe3)/tris(pentafluorophenyl)borane (B(C6F5)3)/trioctylaluminum (AlOct3) catalytic system at -20.degree. was carried out. The no.-av. mol. wt. (.hivin.Mn) of the polymers increased linearly with increasing monomer conversion. The propagating chain ends were successfully reacted with tert-Bu isocyanate, and the .hivin.Mn of the polymer detd. by 1H NMR was in good agreement with the .hivin.Mn detd. by GPC measurement. It is concluded that this catalytic system promoted the syndiospecific **living polymn.** of 4-methylstyrene.

CC 35-4 (Chemistry of Synthetic High Polymers)

ST **polymethylstyrene** syndiotactic **living polymn** methylcyclopentadienyltitanium fluorophenylborane octylaluminum catalyst

IT **Polymerization** catalysts
(syndiospecific **living polymn.** of methylstyrene with methylcyclopentadienyltitanium/fluorophenylborane/octylaluminum catalyst)

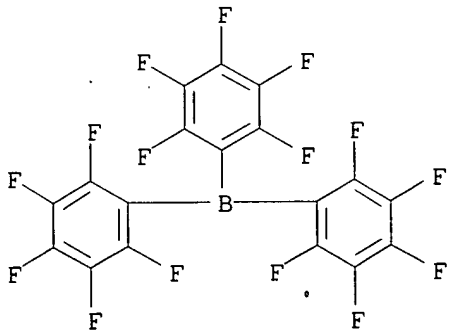
IT 1070-00-4, Trioctylaluminum **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Trimethyl)pentamethylcyclopentadienyltitanium
RL: CAT (Catalyst use); USES (Uses)
(syndiospecific **living polymn.** of methylstyrene with methylcyclopentadienyltitanium/fluorophenylborane/octylaluminum catalyst)

IT 54193-24-7P, Syndiotactic poly(4-methylstyrene)
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(syndiospecific **living polymn.** of methylstyrene with methylcyclopentadienyltitanium/fluorophenylborane/octylaluminum catalyst)

IT **1109-15-5**, Tris(pentafluorophenyl)borane **107333-47-1**, (Trimethyl)pentamethylcyclopentadienyltitanium
RL: CAT (Catalyst use); USES (Uses)
(syndiospecific **living polymn.** of methylstyrene with methylcyclopentadienyltitanium/fluorophenylborane/octylaluminum catalyst)

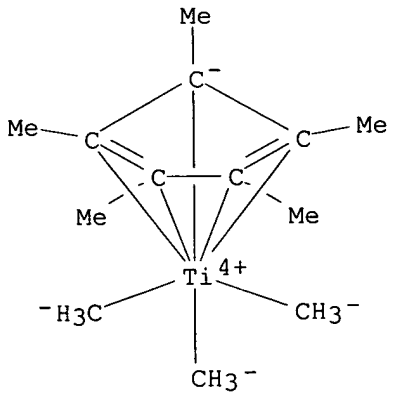
RN 1109-15-5 HCA

CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 107333-47-1 HCA

CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



L48 ANSWER 16 OF 22 HCA COPYRIGHT 2003 ACS on STN
128:283102 Chelating diamide complexes of **titanium**: new catalyst precursors for the highly active and **living** **polymerization** of .alpha.-olefins. Scollard, John D.; McConville, David H.; Vittal, Jagadese J.; Payne, Nicholas C. (University of British Columbia, Department of Chemistry, Vancouver, BC, V6T 1Z1, Can.). Journal of Molecular Catalysis A: Chemical, 128(1-3), 201-214 (English) 1998. CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier Science B.V..

AB The reaction of RHN(CH2)3NHR, where R = 2,6-iso-Pr2C6H3 or R = 2,6-Me2C6H3) with 2 equiv of BuLi followed by 2 equiv of ClSiMe3 yields the silylated diamines R(Me3Si)N(CH2)3N(SiMe3)R. The reaction of the silylated diamines with TiCl4 yields the dichloride complexes [RN(CH2)3NR]TiCl2 and two equiv of ClSiMe3. An x-ray study of [RN(CH2)3NR]TiCl2, R = 2,6-iso-Pr2C6H3, (P21/n, a = 9.771(1) A, b = 14.189(1) A, c = 21.081(2) A, .beta. = 96.27(1).degree., V = 2905.2(5) A3, Z = 4, T = 25.degree., R = 0.0701, Rw = 0.1495) revealed a distorted tetrahedral geometry about **titanium** with the aryl groups lying perpendicular to the TiN2-plane. [RN(CH2)3NR]TiCl2 react with 2 equiv of MeMgBr to give the di-Me derivs. [RN(CH2)3NR]TiMe2. An x-ray study of [RN(CH2)3NR]TiMe2, R = 2,6-Me2C6H3, (P212121, a = 8.0955(10) A, b = 15.288(4) A, c = 16.909(3) A, V = 2092.8(7) A3, Z = 4, T = 23.degree., R = 0.0759, Rw = 0.1458) again revealed a distorted tetrahedral geometry about **titanium** with **titanium**-Me bond lengths of 2.100(9) A and 2.077(9) A. These **titanium** di-Me complexes are active catalysts for the polymn. of 1-hexene, when activated with methylaluminoxane (MAO). Activities up to 350,000 g of poly(1-hexene)/mmol catalyst h were obtained in neat 1-hexene. These systems actively engage in chain transfer to aluminum. Equimolar amts. of [RN(CH2)3NR]TiMe2 and B(C6F5)3 catalyze the **living** aspecific **polymn**. of 1-hexene. Polydispersities (Mw/Mn) as low as 1.05 were measured. Highly active living systems are obtained when [RN(CH2)3NR]TiMe2, R = 2,6-iso-Pr2C6H3, is activated with Ph3C[B(C6F5)4]. A primary insertion mode (1,2 insertion) has been assigned based on both the initiation of the polymer chain and its purposeful termination with iodine.

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29

ST **titanium** diamide complex catalyst polymn olefin; propylenediamine **titanium** complex olefin polymn catalyst; diamine **titanium** complex catalyst polymn olefin; **living** **polymn** olefin **titanium** complex catalyst; Ziegler Natta catalyst olefin **living polymn**

IT Aluminoxanes

RL: CAT (Catalyst use); USES (Uses)
(Me, catalyst; prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT Polymerization catalysts
(Ziegler-Natta; prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT **Polymerization**
(**living**; prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 1109-15-5, Tris(perfluorophenyl)**borane** 136040-19-2
RL: CAT (Catalyst use); USES (Uses)
(catalyst; prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 179612-35-2P 179612-36-3P
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(catalyst; prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 179612-33-0P
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(intermediate; in prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 72991-64-1P 173163-37-6P 179612-31-8P 179612-32-9P 179612-34-1P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(intermediate; in prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 25067-06-5P, Poly(1-hexene) 179612-37-4P 179612-38-5P 205746-70-9P 205746-71-0P 205746-72-1P 205746-73-2P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

IT 75-16-1, Methylmagnesium bromide 75-77-4, Chlorotrimethylsilane, reactions 87-62-7, 2,6-Dimethylaniline 109-64-8, 1,3-Dibromopropane 1822-00-0, (Lithiomethyl)trimethylsilane 4984-82-1, **Cyclopentadienylsodium** 6921-34-2, Benzylmagnesium chloride 7550-45-0, **Titanium** tetrachloride, reactions 24544-04-5, 2,6-Diisopropylaniline
RL: RCT (Reactant); RACT (Reactant or reagent)
(reactant; in prepn. of chelating diamide complexes of **titanium** as new catalyst precursors for highly active and **living polymn.** of .alpha.-olefins)

L48 ANSWER 17 OF 22 HCA COPYRIGHT 2003 ACS on STN
127:319935 Process and catalysts for hydrogenation of conjugated diene polymers. De Boer, Eric Johannes Maria; Hessen, Bart; Van der Huizen, Adriaan Albert; De Jong, Wouter; Van der Linden, Adrianus Johannes; Ruisch, Bart Johan; Schoon, Lodewijk; De Smet, Heleen Johanna Augusta; Van der Steen, Frederik Hendrik; Van Strien, Hubertus Cornelis Thomas Lucianes; Villena, Alan; Walhof, Judith Johanna Berendina (Shell Internationale Research Maatschappij B.V., Neth.). Eur. Pat. Appl. EP

801079 A1 19971015, 10 pp. DESIGNATED STATES: R: BE, DE, ES, FR, GB, IT, NL. (English). CODEN: EPXXDW. APPLICATION: EP 1997-201094 19970411. PRIORITY: EP 1996-302600 19960412.

AB Catalysts suitable for hydrogenating the polybutadiene block in triblock SBR comprise (1) an unbridged (un)substituted titanocene with specified types of addnl. ligands, (2) an alkali metal hydride, and (3) an (un)substituted **borane**. Thus, a triblock SBR with mol. wt. 70,000 and 1,2-configuration 40.4% was hydrogenated in cyclohexane suspension under 50 bars H pressure at 70-80.degree. to 100% conversion in .ltoreq.60 min using a catalyst comprising bis(**butylcyclopentadienyl**)**titanium** dichloride, LiH (formed during workup of the **living polymn**. product), and BF3 or B(C6F5)3.

IC ICM C08C019-02
ICS C08F008-04; C07F017-00

CC 39-7 (Synthetic Elastomers and Natural Rubber)
Section cross-reference(s): 67

IT 960-71-4, Triphenylborane 1109-15-5, Tris(pentafluorophenyl) **borane** 7580-67-8, Lithium hydride 7637-07-2, Boron trifluoride, uses 12113-02-9, Bis(**indenyl**)**titanium** dichloride 73364-20-2
RL: CAT (Catalyst use); USES (Uses)
(process and catalysts for hydrogenation of conjugated diene polymers)

L48 ANSWER 18 OF 22 HCA COPYRIGHT 2003 ACS on STN
127:293780 Dispersing agent, its preparation, and use with an initiator for the cationic dispersion polymerization of isobutylene in liquid carbon dioxide. Kennedy, Joseph P.; Pernecker, Tibor (University of Akron, USA). PCT Int. Appl. WO 9735895 A1 19971002, 29 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1997-US4990 19970326. PRIORITY: US 1996-623854 19960326.

AB Title dispersing agent has a CO2-phobic moiety, which is polyisobutylene-philic, esp. (PIB)CH2C(CH3)2CH2CH2CH2 or CH2CH2CH2C(CH3)2CH2(PIB)CH2C(CH3)2CH2CH2CH2 where PIB = [CH2C(CH3)2]n, and at least one CO2-philic moiety, esp. Si[OSi(CH3)3]3. Thus, 0.36 mol isobutylene was treated with an initiator system comprising 4.4.times.10-3 mol 2-chloro-2,4,4-trimethylpentane in CH3Cl and n-hexane, 6.9.times.10-2 mol TiCl4 in hexane, and 4.6.times.10-3 mol dimethylacetamide at -80.degree. followed by an addn. of 9.4.times.10-2 mol allyltrimethylsilane and the reaction was terminated with methanol to give mono-allyl-terminated polyisobutylene dispersing agent having yield 20.1 g, conversion 99%, Mn 5200, and Mw/Mn 1.23. A polymn. reactor contg. 10 vol.% CH3Cl, 1 wt.% dispersing agent prepd. above, and 30 mL isobutylene was pressurized with CO2 at room temp. and the polymn. was started by adding 2.9.times.10-3 mol/L TiCl4 at -40.degree. and stopped by methanol addn. to give polyisobutylene having yield 75% and Mn 126,800 and 10,000 (multimodal), compared with yield 57% and Mn 101,500 and 10,200 without dispersing agent using CH2Cl2 instead of CH3Cl.

IC ICM C08F008-00

CC 35-4 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 39, 46

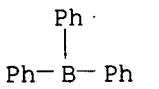
IT **Polymers**, preparation
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(**living**, intermediate; prepn. of dispersing agents for dispersion polymn. of isobutylene in liq. carbon dioxide)

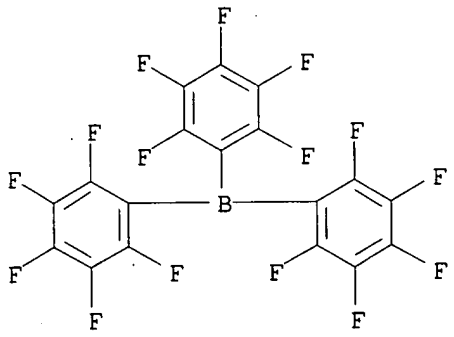
IT **960-71-4**, Triphenylboron **1109-15-5**, Perfluorotriphenylboron 64167-39-1 **107333-47-1**, (Pentamethylcyclopentadienyl)trimethyltitanium 118611-99-7
RL: CAT (Catalyst use); USES (Uses)
(organo-metallic polymn. initiator; prepn. of polyisobutylene by dispersion polymn. in liq. carbon dioxide)

IT **960-71-4**, Triphenylboron **1109-15-5**, Perfluorotriphenylboron **107333-47-1**, (Pentamethylcyclopentadienyl)trimethyltitanium
RL: CAT (Catalyst use); USES (Uses)
(organo-metallic polymn. initiator; prepn. of polyisobutylene by dispersion polymn. in liq. carbon dioxide)

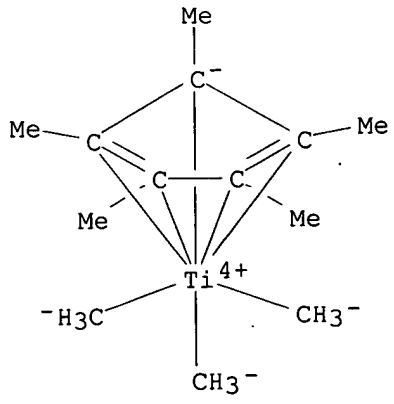
RN 960-71-4 HCA
CN Borane, triphenyl- (8CI, 9CI) (CA INDEX NAME)



RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 107333-47-1 HCA
CN Titanium, trimethyl[(1,2,3,4,5-.eta.)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]- (9CI) (CA INDEX NAME)



L48 ANSWER 19 OF 22 HCA COPYRIGHT 2003 ACS on STN
126:89808 Functionalization and block reactions of polyolefins using metallocene catalysts and **borane** reagents. Chung, T. C.; Lu, H. L. (Department of Materials Science and Engineering The Pennsylvania State University, University Park, PA, USA). Journal of Molecular Catalysis A: Chemical, 115(1), 115-127 (English) 1997. CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier.

AB Discussed was the utilization of metallocene catalyst and **borane** reagent for prepn. of functionalized polyolefins and diblock copolymers contg. polyolefin and functional polymer segments. Two advantages in the metallocene catalyst with strained ligand geometry are (i) the excellent incorporation of high .alpha.-olefin, including **borane**-contg. .alpha.-olefin, into polyolefin chain with relatively narrow mol. wt. and compn. distributions, (ii) the prodn. of polyolefin with chain end unsatn. which can be effectively hydroborated to form the **borane** -terminated polyolefin. In turn, the **borane** groups in polyolefin are very versatile intermediates, which not only can be quant. interconverted to various functional groups but also can easily be oxidized to produce **'living' polymeric** radicals for radical polymn. With the coexistence of free radical-polymerizable monomers, we have prepd. many diblock copolymers, such as PP-b-PMMA, PP-b-PVA and PP-b-PS, most of them would be very difficult to prep. by other methods.

CC 35-3 (Chemistry of Synthetic High Polymers)

ST ethylenebisindenylzirconium dichloride metallocene catalyst polymn propylene; ethylene block polymn **borane** metallocene catalyst; methacrylate diblock polymn **borane** metallocene catalyst; polyolefin catalyst borabicyclononane metallocene

IT Aluminoxanes
RL: CAT (Catalyst use); USES (Uses)
(Me; functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT Metallocenes
RL: CAT (Catalyst use); USES (Uses)
(functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT Polymerization
Polymerization catalysts
(radical; functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT 110012-89-0P, Propylene-styrene block copolymer 185630-55-1P, Ethyl methacrylate-propylene block copolymer 185630-56-2P, Butyl acrylate-propylene block copolymer
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(diblock; functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT 110341-23-6P, Methyl methacrylate-propylene block copolymer
RL: SPN (Synthetic preparation); PREP (Preparation)
(diblock; functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT 280-64-8, 9-Borabicyclononane 100080-82-8, Ethylenebis(**indenyl**)**zirconium** dichloride
RL: CAT (Catalyst use); USES (Uses)
(functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

IT 166602-61-5DP, 5-Hexenyl-9-borabicyclononane-ethylene copolymer, hydrolyzed
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(functionalization and block polymn. of vinyl monomers using metallocene catalysts and **borane** reagents)

L48 ANSWER 20 OF 22 HCA COPYRIGHT 2003 ACS on STN
125:222773 .alpha.-Diimine-transition metal complexes, their preparation and use as catalysts for (co)polymerization of (fluoro)olefins and olefinic esters. Johnson, Lynda Kaye; Killian, Christopher Moore; Arthur, Samuel David; Feldman, Jerald; Mccord, Elizabeth Forrester; Mclain, Stephan James; Kreutzer, Kristina Ann; Bennett, Margaret Anne; Coughlin, Edward Bryan; et al. (E.I. Du Pont De Nemours and Company, USA; University of North Carolina At Chapel Hill). PCT Int. Appl. WO 9623010 A2 19960801, 502 pp. DESIGNATED STATES: W: AL, AM, AU, BB, BG, BR, CA, CN, CZ, EE, FI, GE, HU, IS, JP, KP, KR, LK, LR, LT, LV, MD, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, TR, TT, UA, UZ, VN, AZ, BY, KG, KZ, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1996-US1282 19960124. PRIORITY: US 1995-378044 19950124; US 1995-415283 19950403; US 1995-473590 19950607.

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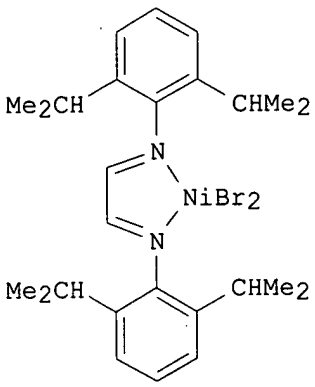


I

AB Ethylene, acyclic olefins, and/or selected cyclic olefins, and optionally selected olefinic esters or carboxylic acids, and other monomers are polymd. using selected transition metal compds. as catalysts, and sometimes other co-catalysts. Since some of the polymns. exhibit some characteristics of **living polymns**., block copolymers can be readily made. Many of the polymers produced are often novel, particularly in regard to their microstructure, which gives some of them unusual properties. Numerous novel catalysts are disclosed, as well as some novel processes for making them. The polymers made are useful as elastomers, molding resins, in adhesives, etc. Also described is the synthesis of linear .alpha.-olefins by the oligomerization of ethylene using, as a catalyst system, a combination of a Ni compd. having a selected .alpha.-diimine ligand and a selected Lewis or Bronsted acid, or by contacting selected .alpha.-diimine Ni complexes with ethylene. For example, polymn. of ethylene for 1 h at 414 kPa and 28-31.degree. in the presence of .alpha.-diimine Ni complex I (prepn. from corresponding .alpha.-diimine and MeOCH2CH2OMe.cntdot.NiBr2 given) and Me aluminoxane gave a cryst., linear polymer m. 127.degree. and having intrinsic viscosity (C6H3Cl3, 135.degree.) 1.925 dL/g.

IC ICM C08F210-16
ICS C08F110-02; C08F110-06; C08F210-06; C08F210-14; C08F210-16; C08F004-60; C08L023-16

CC 35-4 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38, 39, 40, 42, 63, 67

IT 181707-70-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction with Na tetrakis(3,5-bis(trifluoromethyl)phenyl] **borate** in acetonitrile; .alpha.-diimine-transition metal complexes, their prepn. and use as catalysts for (co)polymn. of (fluoro)olefins and olefinic esters)

IT 79060-88-1, Sodium tetrakis(3,5-bis(trifluoromethyl)phenyl]**borate**
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction with Pd diimine complex; .alpha.-diimine-transition metal complexes, their prepn. and use as catalysts for (co)polymn. of (fluoro)olefins and olefinic esters)

IT 7439-89-6D, Iron, diimine complexes 7440-02-0D, Nickel, diimine complexes 7440-05-3D, Palladium, diimine complexes 7440-20-2D, Scandium, diimine complexes 7440-32-6D, **Titanium**, diimine complexes 7440-47-3D, Chromium, diimine complexes 7440-48-4D, Cobalt, diimine complexes 7440-62-2D, Vanadium, diimine complexes 7440-67-7D, **Zirconium**, diimine complexes 163893-65-0 163893-67-2 181709-36-4 181709-40-0 181709-43-3 181709-46-6 181709-49-9 181710-62-3 181710-68-9 181710-76-9 181710-79-2
RL: CAT (Catalyst use); USES (Uses)
(.alpha.-diimine-transition metal complexes, their prepn. and use as catalysts for (co)polymn. of (fluoro)olefins and olefinic esters)

IT 79-10-7DP, 2-Propenoic acid, fluoroalkylethyl esters, polymers with ethylene 2499-59-4DP, Octyl acrylate, fluorinated, polymers with ethylene 9002-88-4P, Polyethylene 9003-07-0P, Polypropylene 9010-77-9DP, Ethylene-Acrylic acid copolymer, Me esters 9010-77-9P, Ethylene-Acrylic acid copolymer 9053-30-9P, tert-Butylstyrene polymer 25038-76-0P, Poly(norbornene) 25038-78-2P, **Dicyclopentadiene** homopolymer 25067-06-5P, 1-Hexene polymer 25068-26-2P, 4-Methyl-1-pentene polymer 25084-90-6P, tert-Butyl acrylate-Ethylene copolymer 25103-74-6DP, Ethylene-Methyl acrylate copolymer, sapond. 25103-74-6P, Ethylene-Methyl acrylate copolymer 25103-85-9P, Cyclopentene homopolymer 25213-96-1P, Ethylene-4-Methyl-1-pentene copolymer 25249-62-1P, Poly(2-butene) 25511-64-2P, 1-Heptene polymer 25511-67-5P, 1-Octadecene homopolymer 25587-79-5P, 1-Pentene polymer 25608-58-6P, 1-Tetradecene polymer 26221-73-8P, Ethylene-1-Octene copolymer 26427-77-0P, Methyl acrylate-Propylene copolymer 27323-11-1P, 1-Eicosene polymer 27323-13-3P, 1-Octadecene-Propylene copolymer 28085-22-5P, Ethylene-Sulfur dioxide copolymer 28428-38-8P, Ethylene-2-Hydroxyethyl acrylate copolymer 28550-69-8P, Ethylene-Methyl vinyl ketone copolymer 28879-48-3P, .beta.-Citronellene-Ethylene copolymer 29036-36-0P, Ethylene-4-Vinylcyclohexene copolymer 29356-56-7P, Ethylene-Ethyl 10-Undecenoate copolymer 31308-02-8P, Cyclopentene-1-Pentene copolymer 32536-03-1P, Ethylene-Cyclopentene copolymer 36704-47-9P, Ethylene-Glycidyl acrylate copolymer 40921-89-9P, Methyl acrylate-1-Pentene copolymer 67612-07-1P, **Cyclopentadiene**-Ethylene copolymer 73764-12-2P, Carbon monoxide-Ethylene-Methyl acrylate copolymer 83623-38-5P, Ethylene-Hydroxypropyl acrylate copolymer 104468-98-6P, Ethylene-Benzyl acrylate copolymer 111190-67-1P 112155-81-4P, Ethylene-Methyl 4-pentenoate copolymer 112155-92-7P, 1,9-Decadiene-Ethylene copolymer 112983-75-2P, Ethylidenenorbornene homopolymer 141655-59-6P 143780-03-4P, 1,1-Dihydroperfluorooctyl acrylate-Ethylene copolymer 171901-52-3P, 1,1-Dihydroperfluorooctyl acrylate-Propylene copolymer 181707-90-4P, Methyl 4-pentenoate polymer 181709-13-7P 181709-16-0P 181709-20-6P 181709-23-9P 181709-27-3P 181709-30-8P 181709-50-2P, Ethylene-2-Methyl-1,5-hexadiene copolymer 181961-61-5P, 4-tert-Butylstyrene-Carbon monoxide copolymer, alternating, syndiotactic

181961-64-8P, 1-Hexene-Propylene block copolymer
RL: IMF (Industrial manufacture); PREP (Preparation)
(.alpha.-diimine-transition metal complexes, their prepn. and use as catalysts for (co)polymn. of (fluoro)olefins and olefinic esters)

L48 ANSWER 21 OF 22 HCA COPYRIGHT 2003 ACS on STN
123:33702 Polymerization of methyl methacrylate with achiral 4B group metallocene compounds. Deng, Hai; Shiono, Takeshi; Soga, Kazuo (Research Lab. Resources Utilization, Tokyo Institute Technology, Yokohama, 227, Japan). Macromolecular Chemistry and Physics, 196(6), 1971-80 (English) 1995. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Huethig & Wepf.

AB Me methacrylate was polymd. with Cp2ZrCl2/methylaluminoxane or Cp2M(CH3)2 (M: **Zr, Hf**; Cp = **cyclopentadienyl**) combined with B(C6F5)3 or Ph3CB(C6F5)4 (I), (Ph = phenyl), in the presence of Lewis acid such as Zn(C2H5)2. A quasi-**living polymn.** was promoted by Cp2Zr(CH3)2/I/Zn(C2H5)2 and gave syndiotactic-rich PMMA with high mol. wt. The polymer yield increased with not only concn. of Cp2Zr(CH3)2/I but also polymn. time, which indicated that the propagation rate was zero order in monomer concn. The increase of polymer yield and initiation efficiency with Zn(C2H5)2 concn. indicated the involvement of Zn(C2H5)2 in the initiation. The propagation reaction was independent of the concn. of Zn(C2H5)2.

CC 35-3 (Chemistry of Synthetic High Polymers)

ST metallocene complex catalyst methacrylate polymn; **zirconium** metallocene complex catalyst methacrylate polymn; **hafnium** metallocene complex catalyst methacrylate polymn; **titanium** metallocene complex catalyst methacrylate polymn; lewis acid effect metallocene methacrylate polymn; PMMA prepn catalyst metallocene

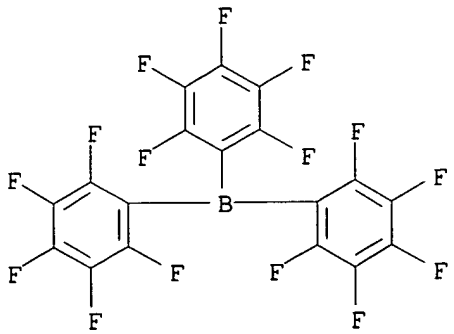
IT Kinetics of **polymerization**
(**living, polymn.** of Me methacrylate with achiral 4B group metallocene compds.)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane** 1271-66-5, **Dicyclopentadienyldimethyltitanium 12636-72-5, Dicyclopentadienyldimethylzirconium 37260-88-1, Dicyclopentadienyldimethylhafnium** 136040-19-2, Trityl tetrakis(pentafluorophenyl)**borate**
RL: CAT (Catalyst use); USES (Uses)
(polymn. of Me methacrylate with achiral 4B group metallocene compds.)

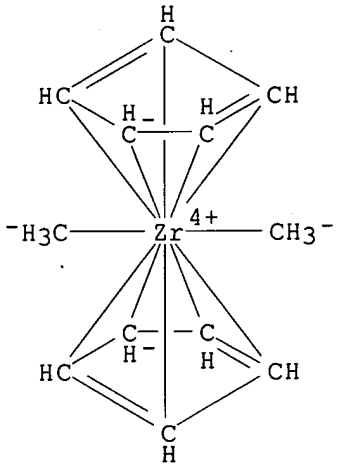
IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
12636-72-5, Dicyclopentadienyldimethylzirconium
37260-88-1, Dicyclopentadienyldimethylhafnium
RL: CAT (Catalyst use); USES (Uses)
(polymn. of Me methacrylate with achiral 4B group metallocene compds.)

RN 1109-15-5 HCA

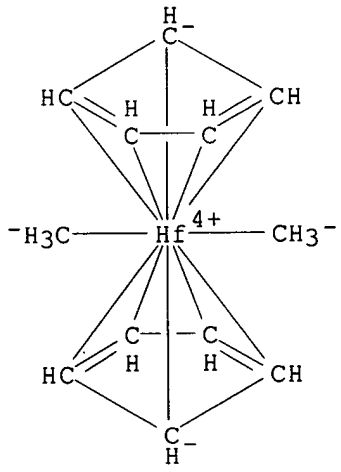
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



RN 37260-88-1 HCA
CN Hafnium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



L48 ANSWER 22 OF 22 HCA COPYRIGHT 2003 ACS on STN
116:61330 Block copolymers from ionic catalysts. Turner, Howard William; Hlatky, Gregory George (Exxon Chemical Patents, Inc., USA). PCT Int. Appl. WO 9112285 A1 19910822, 42 pp. DESIGNATED STATES: W: AU, BR, CA, FI, HU, JP, KR, NO, SU, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1991-US835 19910207. PRIORITY: US 1990-477791 19900209.
AB Block copolymers are prepd. by contacting first olefinic monomer(s) with a catalyst [a reaction product of (a) a metallocene component, and (b) a second component having a cation capable of donating a proton in a compatible noncoordinating anion to produce a **living polymer**], sequentially adding to the living system .gtoreq.1 s monomer(s) to copolymerize with the first polymer to produce a multiblock

copolymer, and recovering the block copolymer. Thus, reaction of bis(**cyclopentadienyl**)dimethylhafnium in PhMe with 1 equiv. [PhMe2NH+][B(C6F5)4-] at room temp. for 5-10 min gave CH4 and the ionic catalyst [Cp2HfMe(PhNMe2)][B(C6F5)4] (Cp = **cyclopentadienyl**). Using the catalysts, C2H4 was polymd. first at 0.degree. in PhMe, propylene was added and polymd. in 30 min. Extn. with hexane indicated that 50-60% of polypropylene chains were in a block copolymer with no.-av. mol. wt. 87,000 and mol. wt. distribution 3.0.

IC ICM C08F297-08
ICS C08F004-64

CC 39-4 (Synthetic Elastomers and Natural Rubber)

ST metallocene catalyst block polymn alkene; **hafnium** metallocene block polymn catalyst; **cyclopentadienylhafnium** fluoroborate polymn catalyst

IT 118612-00-3
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with bis(**cyclopentadienyl**)dimethylhafnium)

IT 37260-88-1, Bis(**cyclopentadienyl**)dimethylhafnium
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with phenyldimethylammonium tetrakis(fluorophenyl) **borate**)

Rip, FYI
This set of records, have organometallic, olefin, Borate + Aluminum Cmpd. These records don't mention living polym.)

=> d L49 1-9 cbib abs hitind hitstr

L49 ANSWER 1 OF 9 HCA COPYRIGHT 2003 ACS on STN
137:311368 Zwitterionic olefin **polymerization** catalysts. Sivak, Andrew Joseph; Zambelli, Adolfo (Sunoco, Inc. (R&M), USA). U.S. US 6465385 B1 20021015, 13 pp. (English). CODEN: USXXAM. APPLICATION: US 2000-502622 20000211. PRIORITY: US 1999-PV119984 19990212.

AB A new zwitterionic **polymn**. catalyst comprises a metallocene cation component with a large noncoordinating anion which contains .gtoreq.1 terminal unsatd. moiety and a high dipole moment zwitterion. During **polymn**., the ionic pairs are dispersed within the polymer particles. When the zwitterionic catalysts are used for olefin **polymn**., no further co-catalysts are needed.

IC ICM C08F004-44
ICS B01J031-38

NCL 502152000

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29

ST zwitterionic **polymn** catalyst manuf; polyolefin manuf metallocene zwitterionic catalyst

IT **Polymerization** catalysts
(metallocene; olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

IT Zwitterions
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

IT Polyolefins
RL: IMF (Industrial manufacture); PREP (Preparation)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

IT **100-99-2**, Tri-iso-butyl aluminum, uses 13037-83-7
136844-77-4 143301-15-9 470479-83-5 470479-85-7
470479-87-9 470671-20-6 470671-21-7
RL: CAT (Catalyst use); USES (Uses)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

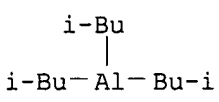
IT **1109-15-5**, Tris(pentafluorophenyl)boron 470479-75-5

470479-77-7 470479-79-9 470479-81-3
RL: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

IT 9002-88-4P, Polyethylene **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

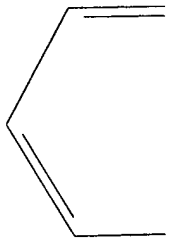
IT **100-99-2**, Tri-iso-butyl aluminum, uses **136844-77-4**
RL: CAT (Catalyst use); USES (Uses)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)

RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)

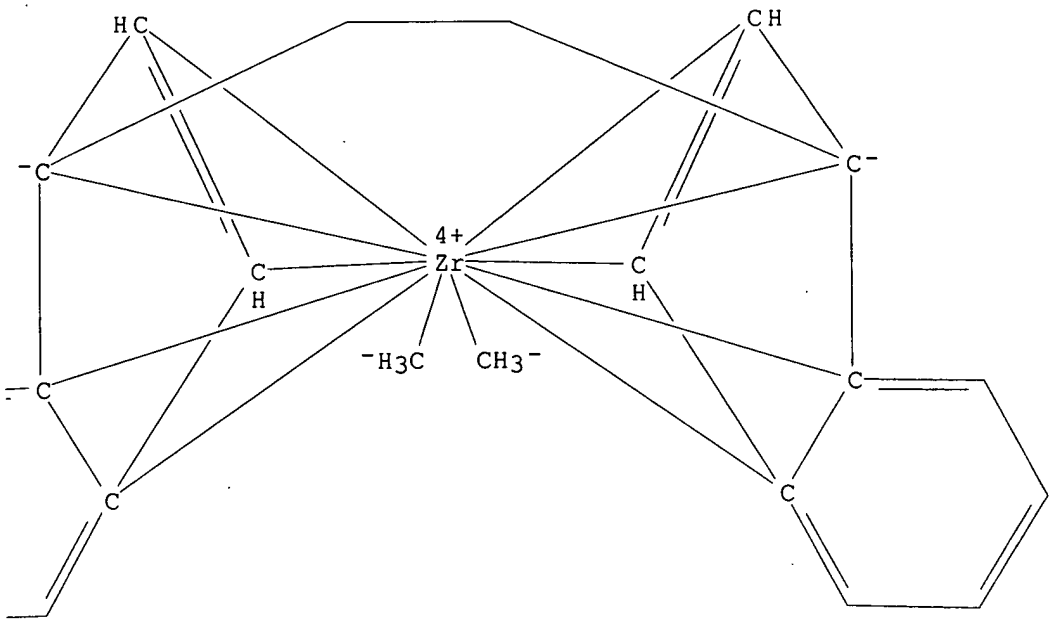


RN 136844-77-4 HCA
CN Zirconium, [rel-(7aR,7'aR)-1,2-ethanediylbis[(1,2,3,3a,7a-.eta.)-1H-inden-1-ylidene]]dimethyl- (9CI) (CA INDEX NAME)

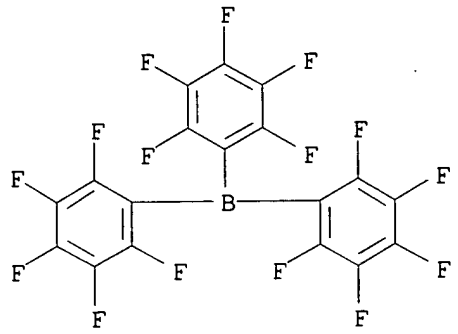
PAGE 1-A



PAGE 1-B



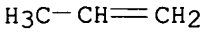
IT **1109-15-5**, Tris(pentafluorophenyl)boron
RL: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(olefin **polymn**. catalysts comprising metallocene-**borate** zwitterions)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

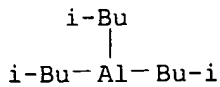
CRN 115-07-1
CMF C3 H6



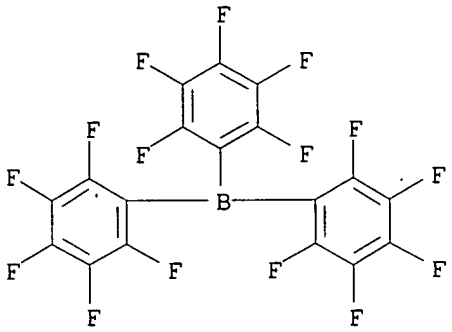
L49 ANSWER 2 OF 9 HCA COPYRIGHT 2003 ACS on STN
134:116337 Polymer blends and process and catalysts for their preparation. Chien, James C. W. (Amherst Polymer Technology, Inc., USA). U.S. US 6177377 B1 20010123, 20 pp. (English). CODEN: USXXAM. APPLICATION: US 1996-768664 19961218.

AB This invention relates to polymer blends and the process for prepg. naturally compatibilized polyolefin blends using a "one-pot" **polymn**. of a single monomer, whereby two homopolymers having different structures are produced as well as a third block copolymer having alternating sequences of the two structural segments of the two homopolymers. The formation of the block copolymer is established by solvent extn. and 13 C-NMR spectroscopy. The catalyst compns. enabling the direct synthesis of naturally compatibilized polymer blend is prepd. by combining four components. The first two components are organometallic complexes of Group IVB or VIIIB elements. The third component is a cocatalyst which irreversibly reacts with at least one ligand on the transition metal complexes. The fourth component is a hydrocarbyl or oxyhydrocarbyl compd. of Group IIIA metals, which functions as a cross-over agent. Propylene was **polymd**. using tri-i-Bu aluminum, rac-dimethylsilyienebis(1-.eta.5-**indenyl**)dichlorozirconium and ethylenebis(9-.eta.5-**fluorenyl**)dichlorozirconium, and cocatalyst to give a mixt. of atactic and isotactic polypropylene.

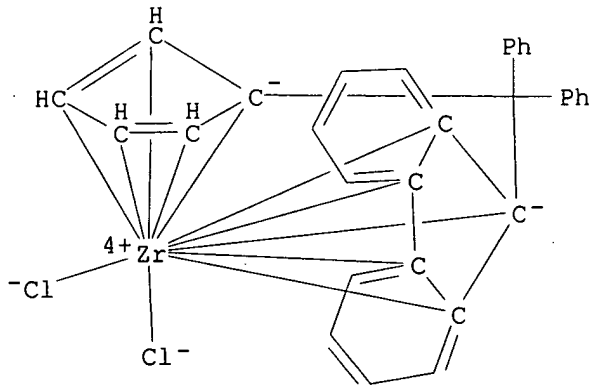
IC ICM B01J020-34
NCL 502113000
CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67
ST crossover agent **polymn** catalyst stereospecific polymer blend
IT Impact-resistant materials
Polymerization catalysts
(polymer blends and process and catalysts for their prepn.)
IT **100-99-2**, Triisobutyl aluminum, uses **1109-15-5**, Tris (pentafluorophenyl) **borane** 121009-93-6 **132510-07-7** 148799-37-5 201140-86-5
RL: CAT (Catalyst use); USES (Uses)
(polymer blends and process and catalysts for their prepn.)
IT 9002-88-4P, Polyethylene **9003-07-0P**, Polypropylene 9003-53-6P, Polystyrene 25085-53-4P, Isotactic polypropylene 25087-34-7P, 1-Butene-ethylene copolymer 25213-02-9P, Ethylene-1-hexene copolymer 26063-22-9P, Syndiotactic polypropylene 28325-75-9P, Syndiotactic polystyrene
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); PREP (Preparation); USES (Uses)
(polymer blends and process and catalysts for their prepn.)
IT **100-99-2**, Triisobutyl aluminum, uses **1109-15-5**, Tris (pentafluorophenyl) **borane 132510-07-7**
RL: CAT (Catalyst use); USES (Uses)
(polymer blends and process and catalysts for their prepn.)
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



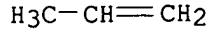
RN 132510-07-7 HCA
CN Zirconium, dichloro[.eta.10-2,4-cyclopentadien-1-ylidene(diphenylmethylene)-9H-fluoren-9-ylidene]- (9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); PREP (Preparation); USES (Uses)
(polymer blends and process and catalysts for their prepn.)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6



L49 ANSWER 3 OF 9 HCA COPYRIGHT 2003 ACS on STN
129:217028 Metallocene catalysts solubilized in hydrocarbon solvents and manufacture of polyolefins. Ishigaki, Satoshi; Hikuma, Shinji; Inasawa, Shintaro; Niki, Kazumi (Nippon Polyolefin K. K., Japan). Jpn. Kokai Tokkyo Koho JP 10212308 A2 **19980811** Heisei, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-18561 19970131.
AB The catalysts are obtained by dissolving aliph. hydrocarbon-insol.

metallocene compds. CpCp'MX1X2 or CpZMX1X2 [Cp, Cp' = (un)substituted **cyclopentadienyl** or **indenyl**; Cp and Cp' may be linked through 1-3 at. groups selected from C, Si, Ge and Sn; Z = R1R2N, R1O, R1R2P; R1, R2 = C.1toreq.2 alkyl, alkylene, C6-10 aryl, arylene, Si-contg. group; R1 and R2 may link with Cp; M = **Ti**, **Zr**, **Hf**; X1, X2 = H, halo, alkoxy, amido; .gtoreq.1 of X1 and X2 is halogen] and org. metal compds. (excluding aluminoxane) in aliph. hydrocarbons, and combining with microparticle-supported cocatalysts. The polyolefins are manufd. by bulk **polymn**. using the catalysts in the absence of arom. hydrocarbons. Thus, **polymn**. of ethylene in the presence of a hexane soln. of bis(**cyclopentadienyl**) **zirconium** dichloride, (iso-Bu)3Al and silica-supported Me aluminoxane showed no fouling on reactor walls.

IC ICM C08F004-64
ICS C08F010-00

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29, 67

ST metallocene catalyst polyolefin bulk **polymn** fouling; **cyclopentadienylzirconium** chloride metallocene catalyst hexane soln; butyl aluminum metallocene catalyst solubilization polyethylene; methyl aluminoxane silica support catalyst

IT **Polymerization** catalysts
(bulk; metallocene catalysts for prepn. of polyolefins without fouling on reactors)

IT **Polymerization** catalysts
(metallocene; metallocene catalysts for prepn. of polyolefins without fouling on reactors)

IT **1291-32-3**, Bis(**cyclopentadienyl**)**zirconium** dichloride 112243-78-4 135910-63-3 158515-16-3 161442-55-3
RL: CAT (Catalyst use); USES (Uses)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

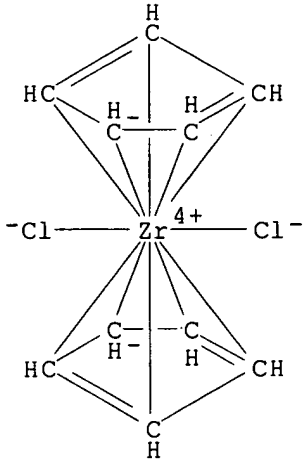
IT 9002-88-4P, Polyethylene **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane** 5882-44-0
10026-04-7, Silicon tetrachloride 29680-44-2
RL: RCT (Reactant); RACT (Reactant or reagent)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

IT **100-99-2**, Triisobutylaluminum, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

IT **1291-32-3**, Bis(**cyclopentadienyl**)**zirconium** dichloride
RL: CAT (Catalyst use); USES (Uses)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

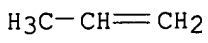
RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)



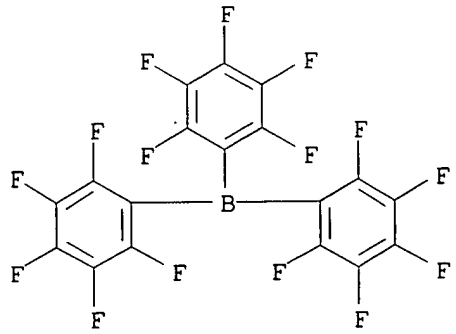
IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6

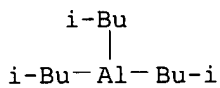


IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
RL: RCT (Reactant); RACT (Reactant or reagent)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



IT **100-99-2**, Triisobutylaluminum, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(metallocene catalysts for prepn. of polyolefins without fouling on reactors)

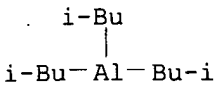
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



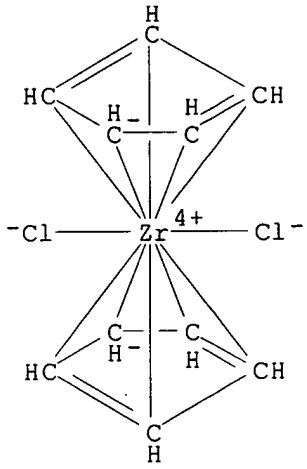
L49 ANSWER 4 OF 9 HCA COPYRIGHT 2003 ACS on STN
129:41529 Boron compounds, olefin **polymerization** catalyst components containing them, and preparation of polyolefins therewith. Ono, Michio; Higuma, Shinji; Inasawa, Shintaro (Nippon Polyolefin K. K., Japan). Jpn. Kokai Tokkyo Koho JP 10130316 A2 **19980519** Heisei, 12 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-291895 19961101.

AB The catalyst components, useful for promoters of metallocene catalysts, are Lewis acid-supported B-R1R2R3YiSiR4R5R6X+ (R1-3 = C1-20 alkyl, arylalkyl, halo-contg. alkyl, halo-contg. arylalkyl, aryl, alkylaryl, halo-contg. aryl, halo-contg. alkylaryl; Y = C1-10 alkylene, arylalkylene, halo-contg. alkylene, halo-contg. arylalkylene, arylene, alkylarylene, halo-contg. arylene, halo-contg. alkylarylene; R4-6 = C1-10 alkoxy, C1-20 alkyl, arylalkyl, aryl, alkylaryl, at least one of them is C1-10 alkoxy; X+ = monovalent cation; i = 0, 1). Thus, N,N-dimethylanilinium tris(pentafluorophenyl)-1-dimethoxysilylmethyl-2,3,5,6-tetrafluorophenylborate in CH2Cl2 was heated with MgCl2 in THF under reflux to obtain solid component, then ethylene was **polymd**. in the presence of the solid component, Al(CH2CMe2)3, and zirconocene dichloride at 10 kg/cm2 and 70.degree. for 30 min to give HDPE having d. 0.954 with no scale deposition on the reactor wall.

IC ICM C08F004-58
ICS C08F004-52; C08F010-00
CC 35-4 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67
ST metallocene catalyst promoter alkoxysilyl fluorophenyl **borate**; scale prevention HDPE manuf catalyst **borate**
IT **Polymerization** catalysts
(metallocene; boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
IT **100-99-2**, Triisobutylaluminum, uses **1291-32-3**, Zirconocene dichloride 161442-55-3
RL: CAT (Catalyst use); USES (Uses)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
IT 9002-88-4P **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
IT 109-72-8, Butyllithium, reactions 121-69-7, N,N-Dimethylaniline, reactions **1109-15-5**, Tris(pentafluorophenyl)**borane** 1559-88-2, 1-Bromo-2,3,5,6-tetrafluorobenzene
RL: RCT (Reactant); RACT (Reactant or reagent)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
IT **100-99-2**, Triisobutylaluminum, uses **1291-32-3**, Zirconocene dichloride
RL: CAT (Catalyst use); USES (Uses)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



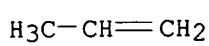
RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)



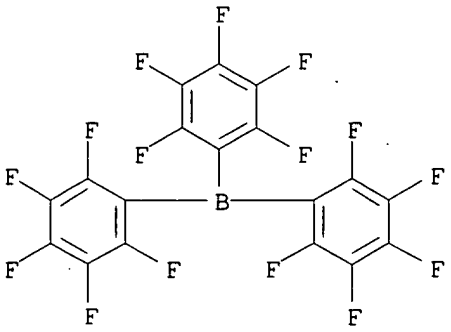
IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6



IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
RL: RCT (Reactant); RACT (Reactant or reagent)
(boron compds. for metallocene catalyst promoters in polyolefin manuf. with reduced scale formation)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



L49 ANSWER 5 OF 9 HCA COPYRIGHT 2003 ACS on STN
125:276888 Tris(pentafluorophenyl)**borate** complexes and olefin **polymerization** catalysts derived from them. Siedle, Allen R.; Miller, John A.; Lamanna, William M. (Minnesota Mining and Mfg. Co., USA). PCT Int. Appl. WO 9626967 A1 **19960906**, 45 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN. (English). CODEN: PIXXD2. APPLICATION: WO 1996-US737 19960119. PRIORITY: US 1995-396966 19950301.

AB Tris(pentafluorophenyl)**borane** complexes having general formula (C6F5)Bx(YXH)q [X = O, S; q = 1-3; Y = H, C1-500 hydrocarbyl which may O and/or F, R13Si, (R2)2C:N; R1 = C1-25 alkyl, Ph, SiO-contg. group; R2 = C1-25 hydrocarbyl] are synthesized and used in combination with other organometallic compds. as catalysts for **polymn**. and copolymn. of olefins. Rubbery polymers produced by using these catalysts are useful in making pressure-sensitive adhesives and packaging film. Propylene was **polymd**. by using catalysts including tris(pentafluorophenyl) **borane** complex with octadecanol, [1,2-bis(9-**fluorenyl**)ethane]**zirconium** di-Me, and tri-n-octylaluminum to give a polymer with wt.-av. mol. wt. 500,000, no.-av. mol. wt. 228,000, polydispersity index 2.59, and Tg 270 K.

IC ICM C08F010-00
ICS C08F004-64; C09J123-16

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38, 39

ST olefin **polymn** catalyst coordination; **borane** pentafluorophenyl complex olefin **polymn** catalyst; rubber olefin adhesive pressure sensitive

IT Rubber, synthetic
RL: IMF (Industrial manufacture); PREP (Preparation)
(hexene-tetradecadiene; tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT Rubber, synthetic
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(octene-propylene; tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT Naphthenic oils
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(plasticizing oil; olefin **polymn**. catalysts derived from tris(pentafluorophenyl)**borate** complexes for producing rubbery

polymers and adhesives)
IT Rubber, ethylene-propene
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT Aluminoxanes
RL: CAT (Catalyst use); USES (Uses)
(Me, tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT Petroleum resins
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(aliph., tackifying agent; olefin **polymn**. catalysts derived from tris(pentafluorophenyl)**borate** complexes for producing rubbery polymers and adhesives)
IT **Polymerization** catalysts
(coordination, tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT Packaging materials
(films, polyolefins produced by using catalysts derived from tris(pentafluorophenyl)**borate** complexes for cling films)
IT Alkenes
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymers, tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT Adhesives
(pressure-sensitive, olefin **polymn**. catalysts derived from tris(pentafluorophenyl)**borate** complexes for producing rubbery polymers and adhesives)
IT Rubber, synthetic
RL: IMF (Industrial manufacture); PREP (Preparation)
(propene, tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT 9010-79-1P
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(rubber, tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT **9003-07-0P**, Polypropylene 83266-01-7P
RL: IMF (Industrial manufacture); PREP (Preparation)
(rubber; tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT 25895-45-8P, 1-Octene-propylene copolymer
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(rubber; tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
IT 25766-18-1, Zonarez A 25 69900-02-3, Wingtack Plus
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(tackifying agent; olefin **polymn**. catalysts derived from tris(pentafluorophenyl)**borate** complexes for producing rubbery polymers and adhesives)
IT **100-99-2**, Triisobutylaluminum, uses **1070-00-4**, Tri-n-octylaluminum 5333-42-6, Exxal 20 **12636-72-5** **37260-88-1** 49596-02-3 49596-06-7 60373-20-8 113161-86-7 148799-59-1 168328-76-5 182683-46-1 182683-47-2
RL: CAT (Catalyst use); USES (Uses)

(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT 64-17-5DP, Ethanol, perfluoroalkyl derivs., compd. with tris(pentafluorophenyl)**borane** **1109-15-5DP**, Tris(pentafluorophenyl)**borane**, compd. with perfluoroalkylethanol 50981-41-4DP, Polyhexene, alc. derivs., compd. with tris(pentafluorophenyl)**borane** 118611-16-8P 147892-18-0P 155962-38-2P 156031-41-3P 182683-37-0P 182683-38-1P 182683-39-2P 182683-40-5P 182683-42-7P 182683-44-9P
RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT 182683-62-1P 182683-63-2P
RL: CAT (Catalyst use); IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
RL: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT 9002-88-4P, Polyethylene **25067-06-5P**, 1-Hexene homopolymer 25103-85-9P, Cyclopentene homopolymer 25511-67-5P, 1-Octadecene homopolymer 25749-43-3P 25895-44-7P, 1-Hexene-propylene copolymer
RL: IMF (Industrial manufacture); PREP (Preparation)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

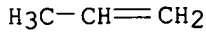
IT 67-56-1, Methanol, reactions 100-64-1, Cyclohexanone oxime 111-76-2, 2-Butoxyethanol 111-83-1, 1-Octyl bromide 112-92-5, 1-Octadecanol 121-44-8, reactions 917-54-4, Methyllithium 1779-49-3, Methyltriphenylphosphonium bromide 2885-00-9, 1-Octadecylmercaptan 4984-82-1 13499-05-3, **Hafnium** tetrachloride 17477-97-3, Tris(trimethylsiloxy)silanol 76514-39-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PREP (Preparation)
(rubber; tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

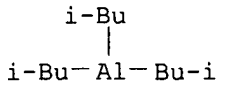
CM 1

CRN 115-07-1
CMF C3 H6

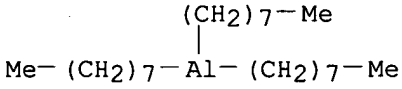


IT **100-99-2**, Triisobutylaluminum, uses **1070-00-4**, Tri-n-octylaluminum **12636-72-5** **37260-88-1**
RL: CAT (Catalyst use); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)

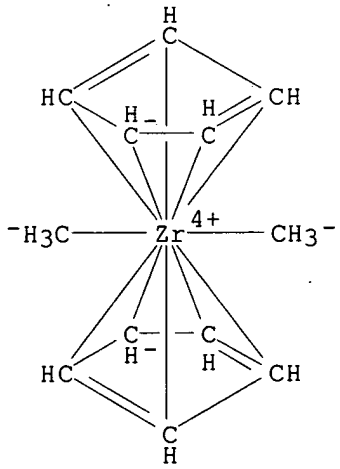
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



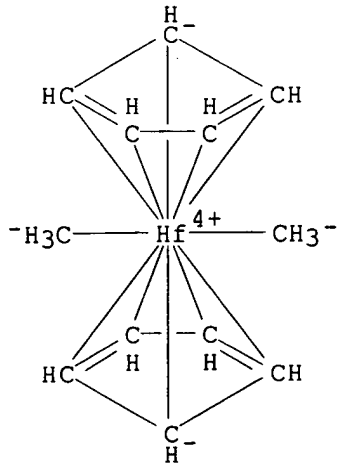
RN 1070-00-4 HCA
CN Aluminum, trioctyl- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



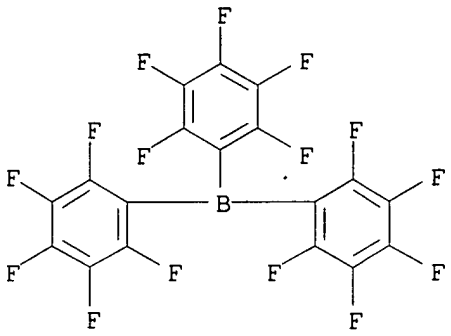
RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



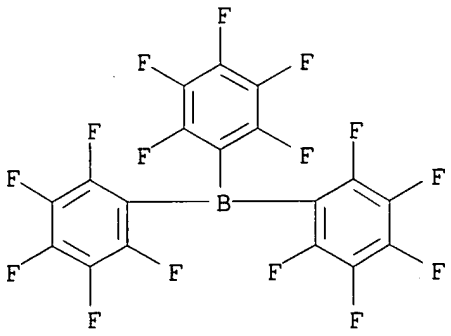
RN 37260-88-1 HCA
CN Hafnium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



IT **1109-15-5DP**, Tris(pentafluorophenyl)**borane**, compd. with perfluoroalkylethanol
RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



IT **1109-15-5**, Tris(pentafluorophenyl)**borane**
RL: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



IT **25067-06-5P**, 1-Hexene homopolymer
RL: IMF (Industrial manufacture); PREP (Preparation)
(tris(pentafluorophenyl)**borate** complexes and olefin **polymn**. catalysts derived from them)
RN 25067-06-5 HCA
CN 1-Hexene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 592-41-6
CMF C6 H12

$H_2C{=}CH{-}Bu\text{-}n$

L49 ANSWER 6 OF 9 HCA COPYRIGHT 2003 ACS on STN
124:290568 Olefin **polymerization** catalyst and process for olefin **polymerization**. Sakiyama, Mitsuaki; Sangaya, Sei; Ouchi, Kunihiro (Mitsui Petrochemical Industries, Ltd., Japan). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1111645 A **19951115**, 71 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 1994-120029 19941227. PRIORITY: JP 1993-362319 19931227; JP 1993-333624 19931227.

AB Series of transition metal bimetallic metallocene compds. having .eta.5-**cyclopentadienyl**-type ligands are synthesized and used together with organoaluminum compds. or org. boron compds. as olefin **polymn**. catalysts. An example of such metal complex was [.mu.-[(1,2,3,4,5-.eta.:1',2',3',4',5'-.eta.)-[bi-2,4-**cyclopentadien**-1-yl]-1,1'-diyl]]dichlorobis(.eta.5-2,4-**cyclopentadien**-1-yl)-.mu.-oxodizirconium which was used together with Me aluminoxane in ethylene **polymn**. The catalyst system is highly active and suitable for producing olefin polymers with wide mol. wt. distribution at relatively low temp.

IC ICM C08F110-00
ICS C08F004-54

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 29

ST **polymn** catalyst coordination bimetallic; metallocene bimetallic olefin **polymn** catalyst

IT Sandwich compounds
RL: CAT (Catalyst use); IMF (Industrial manufacture); PRP (Properties); PREP (Preparation); USES (Uses)
(olefin **polymn**. catalyst and process for olefin **polymn**.)

IT Aluminoxanes
RL: CAT (Catalyst use); USES (Uses)
(Me, olefin **polymn**. catalyst and process for olefin **polymn**.)

IT **Polymerization** catalysts
(coordination, olefin **polymn**. catalyst and process for olefin **polymn**.)

IT Alkenes, preparation
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(polymers, olefin **polymn**. catalyst and process for olefin **polymn**.)

IT 75-24-1, Trimethylaluminum **100-99-2**, Triisobutylaluminum, uses **1109-15-5**, Tris(pentafluorophenyl)boron 118612-00-3 136040-19-2, Triphenylcarbonium tetrakis(pentafluorophenyl)**borate**
RL: CAT (Catalyst use); USES (Uses)
(olefin **polymn**. catalyst and process for olefin **polymn**.)

IT 100946-30-3P 118920-56-2P 118920-57-3P 144375-06-4P 144375-09-7P 169212-27-5P 170283-40-6P 170283-41-7P 170283-42-8P 176219-30-0P 176219-31-1P
RL: CAT (Catalyst use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(olefin **polymn**. catalyst and process for olefin **polymn**.)

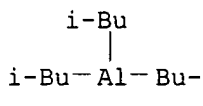
IT 9002-88-4P **9003-07-0P**, Polypropylene 9010-79-1P, Ethylene-propylene copolymer
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(olefin **polymn**. catalyst and process for olefin **polymn**.)

IT 75-78-5, Dichlorodimethylsilane 102-54-5, Ferrocene 1270-98-0, **Cyclopentadienyltitanium** trichloride **1291-32-3**,

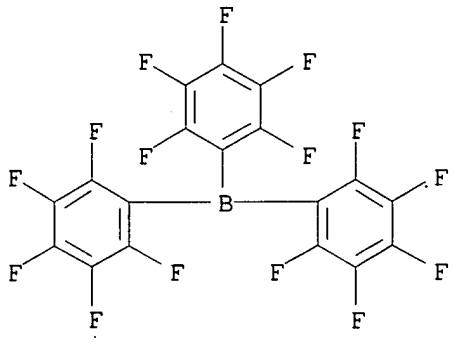
Dicyclopentadienylzirconium dichloride 7550-45-0,
Titanium tetrachloride, reactions 13499-05-3, **Hafnium**
tetrachloride 34767-44-7, **Cyclopentadienylzirconium**
trichloride 75181-07-6, **Pentamethylcyclopentadienylzirconium**
trichloride 75181-08-7, **Pentamethylcyclopentadienylhafnium**
trichloride 87122-68-7
RL: RCT (Reactant); RACT (Reactant or reagent)
(prepn. of olefin **polymn.** catalyst)

IT **100-99-2**, Triisobutylaluminum, uses **1109-15-5**,
Tris(pentafluorophenyl)boron
RL: CAT (Catalyst use); USES (Uses)
(olefin **polymn.** catalyst and process for olefin
polymn.)

RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)

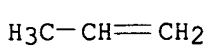


IT **9003-07-0P**, Polypropylene
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(olefin **polymn.** catalyst and process for olefin
polymn.)

RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

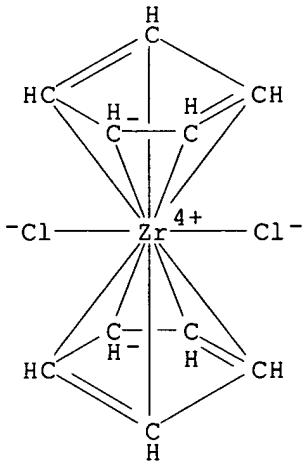
CM 1

CRN 115-07-1
CMF C3 H6



IT **1291-32-3**, **Dicyclopentadienylzirconium** dichloride
RL: RCT (Reactant); RACT (Reactant or reagent)
(prepn. of olefin **polymn.** catalyst)

RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)



L49 ANSWER 7 OF 9 HCA COPYRIGHT 2003 ACS on STN
121:84206 Preparation of polyolefins. Kamitsuma, Masahiro (Idemitsu Kosan Co, Japan). Jpn. Kokai Tokkyo Koho JP 05331219 A2 **19931214** Heisei, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1992-137443 19920529.

AB The polyolefins with no yellowing, useful for films, foams, and packaging materials, are prepd. by (co)**polymg**. olefins in the presence of catalysts contg. (A) transition metal compds., (B) compds. forming ionic complexes with transition metal compds., and (C) org. Al compds., followed by treating the **polymn**. mixt. with C.gtoreq.3 branched alc. in an amt. of 3-25 mol to 1 mol the Al compds. Thus, propylene was **polymd**. with CH2:CH2 in the presence of 0.6 mmol triisobutylaluminum and a solid catalyst prepd. from .gamma.-Al2O3, bis(**cyclopentadienyl**)**zirconium** dichloride, triisobutylaluminum, and dimethylanilinium tetrakis(pentafluorophenyl) **borate**, mixing with iso-Pr alc., and pressing to obtain a plate with no yellowing.

IC ICM C08F006-08
ICS C08F004-642; C08F010-00

CC 35-2 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 37, 38

ST polyolefin **polymn** catalyst transition metal; aluminum transition metal **polymn** catalyst; colorless polypropylene plate **polymn** catalyst; isopropyl alc olefin **polymn**; ethylene **polymn** catalyst isopropyl alc; octene ethylene **polymn** catalyst; olefin **polymn** transition metal complex

IT **Polymerization** catalysts
(org. aluminum compds. and transition metal complexes for, for prepn. of polyolefins)

IT **100-99-2**, Triisobutylaluminum, uses
RL: CAT (Catalyst use); USES (Uses)
(catalysts contg., for prepn. of polyolefins)

IT 102-54-5, Ferrocene 109-72-8, Butyllithium, uses 344-04-7 1076-44-4, Pentafluorophenyllithium **1109-15-5 1291-32-3** 2797-28-6 5882-44-0, Dimethylaniline hydrochloride 10026-11-6, **Zirconium** tetrachloride 10294-34-5, Boron trichloride **12636-72-5** 24356-01-2, Tetrabenzylzirconium
RL: USES (Uses)
(catalysts from, for prepn. of polyolefins)

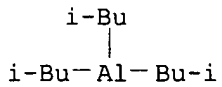
IT **9003-07-0P** 9010-79-1P, Ethylene-propylene copolymer 26221-73-8P, Ethylene-1-octene copolymer

RL: PREP (Preparation)
(prepn. of, catalysts for, contg. transition metal complexes and org. aluminum compds., for plates with colorless)

IT 1344-28-1, Aluminum oxide (Al2O3), uses
RL: USES (Uses)
(.gamma.-, supports, for **polymn.** catalysts)

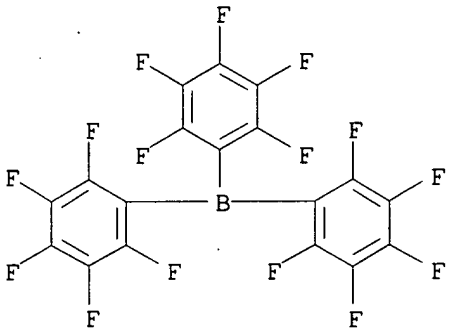
IT **100-99-2**, Triisobutylaluminum, uses
RL: CAT (Catalyst use); USES (Uses)
(catalysts contg., for prepn. of polyolefins)

RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)

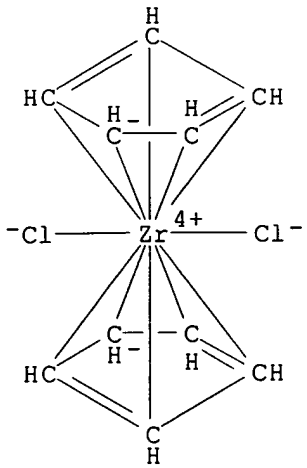


IT **1109-15-5 1291-32-3 12636-72-5**
RL: USES (Uses)
(catalysts from, for prepn. of polyolefins)

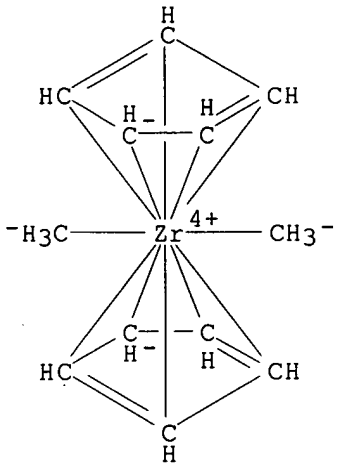
RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 1291-32-3 HCA
CN Zirconium, dichlorobis(.eta.5-2,4-cyclopentadien-1-yl)- (9CI) (CA INDEX NAME)



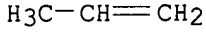
RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



IT **9003-07-0P**
RL: PREP (Preparation)
(prepn. of, catalysts for, contg. transition metal complexes and org. aluminum compds., for plates with colorless)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

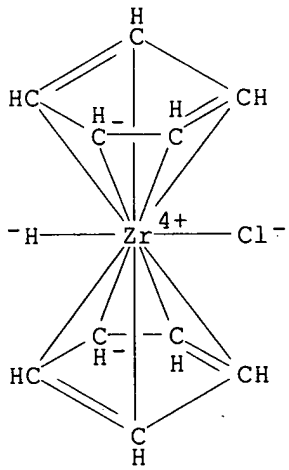
CM 1

CRN 115-07-1
CMF C3 H6

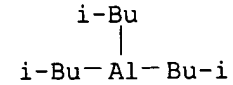


L49 ANSWER 8 OF 9 HCA COPYRIGHT 2003 ACS on STN
120:165236 Process for producing a catalyst system, process for the (co) **polymerization** of olefins and (co)polymers of at least one olefin. Zandona, Nicola (Solvay et Cie., Belg.). Eur. Pat. Appl. EP 573120 A1 **19931208**, 18 pp. DESIGNATED STATES: R: AT, BE, DE, ES, FR, GB, IT, NL, PT, SE. (French). CODEN: EPXXDW. APPLICATION: EP 1993-201560 19930601. PRIORITY: BE 1992-526 19920605.
AB The title catalysts are prepd. by mixing organoaluminum compds. and .gtoreq.1 transition metal metallocene in a hydrocarbon diluent, then adding an ionizing agent. The catalysts have stable activity on storage. A typical catalyst was prepd. from ethylenebis(**indenyl**) **zirconium** dichloride, Et2Al, and triphenylcarbenium tetrakis(pentafluorophenyl)**borate** activator and was used to **polymerize** ethylene.
IC ICM C08F010-00
ICS C08F004-647
CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67
ST catalyst **polymn** transition metal metallocene; triphenylcarbenium tetrakispentafluorophenylborate activator **polymn** catalyst; olefin **polymn** transition metal metallocene

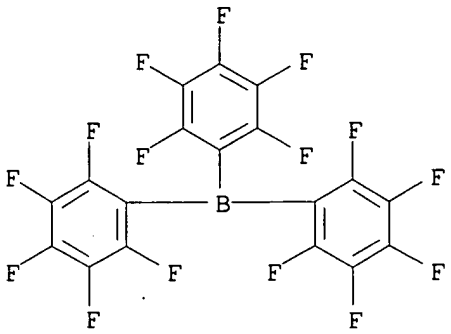
IT **Polymerization** catalysts
(transition metal metallocenes, for **polymn**. of olefins)
IT Transition metals, compounds
RL: CAT (Catalyst use); USES (Uses)
(sandwich compds., catalysts, for **polymn**. of olefins)
IT 2768-02-7D, Vinyltrimethoxysilane, reaction products with bis(**cyclopentadienyl**)zirconum hydrochloride 11136-36-0, Bis(**pentamethylcyclopentadienyl**)**titanium** dichloride **37342-97-5D**, reaction products with vinyltrimethoxysilane 100080-82-8, Ethylenebis(**indenyl**)**zirconium** dichloride 135910-63-3, Ethylenebis(**indenyl**)**hafnium** dichloride
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for **polymn**. of olefins)
IT 97-93-8, Triethylaluminum, uses **100-99-2**, Triisobutylaluminum, uses **1109-15-5** 136040-19-2, Triphenylcarbenium tetrakis(pentafluorophenyl)**borate**
RL: CAT (Catalyst use); USES (Uses)
(catalysts, with transition metal metallocenes, for **polymn**. of olefins)
IT 9002-88-4P, Polyethylene **9003-07-0P**, Polypropylene 28501-59-9P, Ethylene-1,5-hexadiene copolymer
RL: PREP (Preparation)
(prepn. of, transition metal metallocene catalysts for)
IT **37342-97-5D**, reaction products with vinyltrimethoxysilane
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for **polymn**. of olefins)
RN 37342-97-5 HCA
CN Zirconium, chlorobis(.eta.5-2,4-cyclopentadien-1-yl)hydro- (9CI) (CA INDEX NAME)



IT **100-99-2**, Triisobutylaluminum, uses **1109-15-5**
RL: CAT (Catalyst use); USES (Uses)
(catalysts, with transition metal metallocenes, for **polymn**. of olefins)
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropylene
RL: PREP (Preparation)
(prepn. of, transition metal metallocene catalysts for)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6

$H_3C-CH=CH_2$

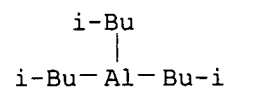
L49 ANSWER 9 OF 9 HCA COPYRIGHT 2003 ACS on STN
117:251983 Process for producing olefinic polymers. Matsumoto, Junichi; Okamoto, Takuji; Watanabe, Masami; Ishihara, Nobuhide (Idemitsu Kosan Co., Ltd., Japan). PCT Int. Appl. WO 9209640 A1 **19920611**, 48 pp. DESIGNATED STATES: W: US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 1991-JP1658 19911129. PRIORITY: JP 1990-329539 19901130; JP 1991-103754 19910409.
AB Homopolymers and copolymers of .alpha.-olefins are prepd. without using a large amt. of organoaluminum compds. (e.g. aluminoxanes) by using a catalyst compn. contg. transition metal compds., compds. capable of forming ionic complexes with transition metal compds., and organoaluminum compds. Thus, **polymn**. of 10 kg/cm2 ethylene by 0.2 mmol triisobutylaluminum and 0.01 mmol ferrocenium tetrakis(pentafluorophenyl) **borate** in 400 mL PhMe at 60.degree. for 10 min gave 180 g polyethylene with wt.-av. mol. wt. 193,000, and mol. wt. distribution 3.99.
IC ICM C08F010-00
ICS C08F004-643; C08F004-65; C08F004-70
CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 67
ST ethylene **polymn** catalyst; syndiotactic polypropylene **polymn** catalyst; propylene ethylene **polymn** catalyst; methylpentene syndiotactic polymer prepn; methylbutene syndiotactic polymer prepn; transition metal complex **polymn** catalyst; octene ethylene **polymn** catalyst
IT **Polymerization** catalysts
(transition metal compds. and complexes, for .alpha.-olefins)

IT 97-93-8, Triethylaluminum, uses **100-99-2**, Triisobutylaluminum, uses 1071-76-7, Tetrabutoxyzirconium **1109-15-5**, Tris(pentafluorophenyl)**borane** 10026-11-6, Tetrachlorozirconium **12636-72-5**, Bis(**cyclopentadienyl**)dimethylzirconium 13499-05-3, **Hafnium** tetrachloride 24356-01-2, Tetrabenzylzirconium 118612-00-3 130139-66-1 130638-44-7 130638-45-8 132530-06-4 132880-05-8 135104-33-5 135348-57-1 136019-48-2 144672-44-6 144741-18-4 144772-00-9 144772-01-0 144772-02-1
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for **polymn**. of .alpha.-olefins)

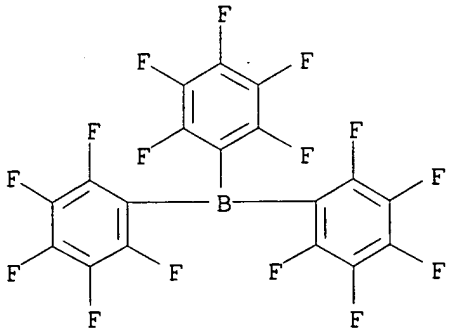
IT 9002-88-4P, Polyethylene **9003-07-0P**, Polypropylene 9010-79-1P, Ethylene-propene copolymer 26063-22-9P, Polypropylene, syndiotactic 26221-73-8P, Ethylene-1-octene copolymer 131724-39-5P 138875-96-4P
RL: PREP (Preparation)
(prepn. of, catalysts for)

IT **100-99-2**, Triisobutylaluminum, uses **1109-15-5**, Tris(pentafluorophenyl)**borane** **12636-72-5**, Bis(**cyclopentadienyl**)dimethylzirconium
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for **polymn**. of .alpha.-olefins)

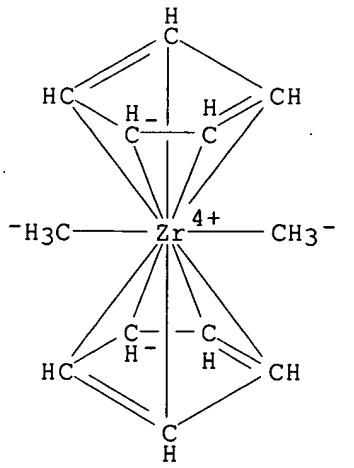
RN 100-99-2 HCA
CN Aluminum, tris(2-methylpropyl)- (9CI) (CA INDEX NAME)



RN 1109-15-5 HCA
CN Borane, tris(pentafluorophenyl)- (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 12636-72-5 HCA
CN Zirconium, bis(.eta.5-2,4-cyclopentadien-1-yl)dimethyl- (9CI) (CA INDEX NAME)



IT **9003-07-0P**, Polypropylene
RL: PREP (Preparation)
(prepn. of, catalysts for)
RN 9003-07-0 HCA
CN 1-Propene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1
CMF C3 H6